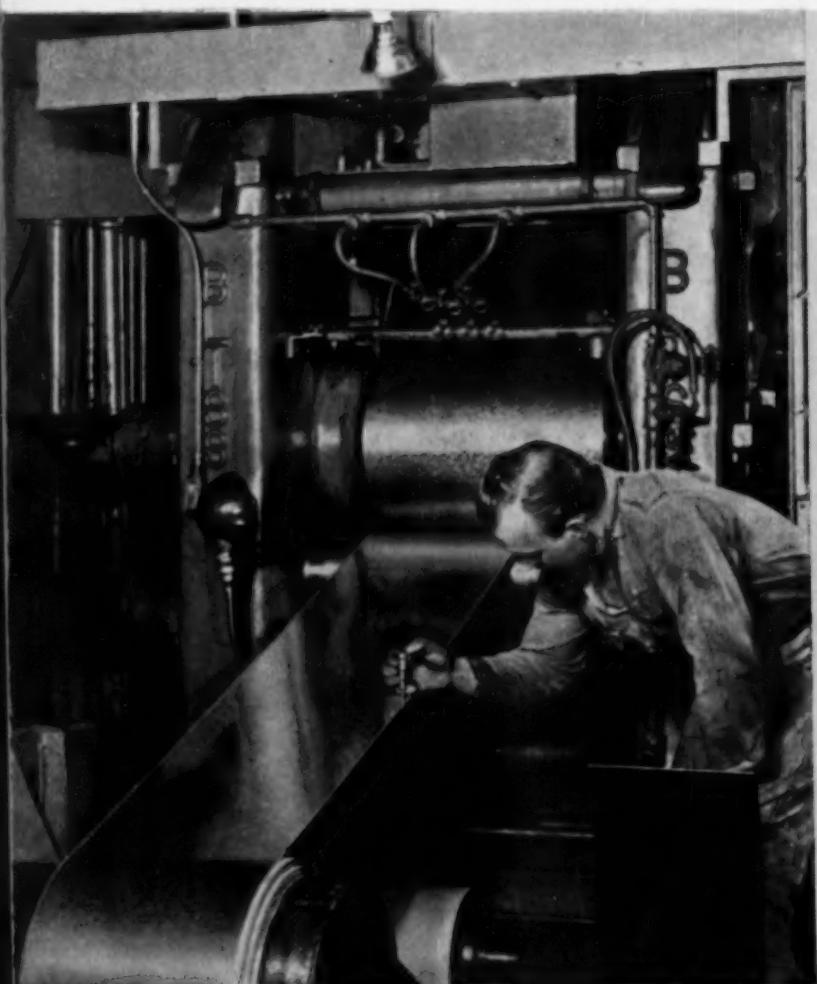


The Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • NOVEMBER 24, 1955

Aviation boom:
How you can
share in it.
See page 39



A Challenging New Product!

Steel strip with a rolled-in pattern design in a sparkling range of coatings and finishes

The new "Pattern Design" steel strip is offering product designers a challenging opportunity to improve product sales appeal and, at the same time, cut fabrication costs. It provides these advantages.

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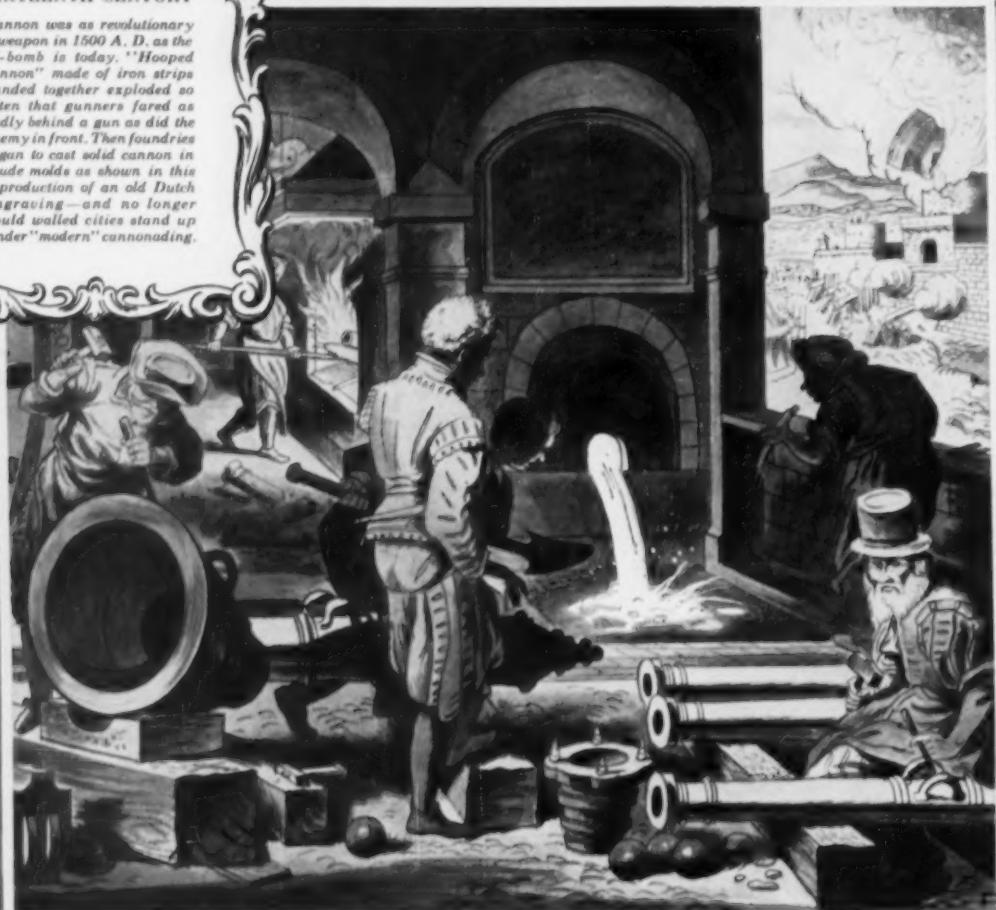
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Cannon was as revolutionary a weapon in 1500 A. D. as the H-bomb is today. "Hooped cannon" made of iron strips banded together exploded so often that gunners fared as badly behind a gun as did the enemy in front. Then foundries began to cast solid cannon in crude molds as shown in this reproduction of an old Dutch engraving—and no longer could walled cities stand up under "modern" cannonading.



Crafts and craftsmen through the ages

NUMBER FIVE OF A SERIES

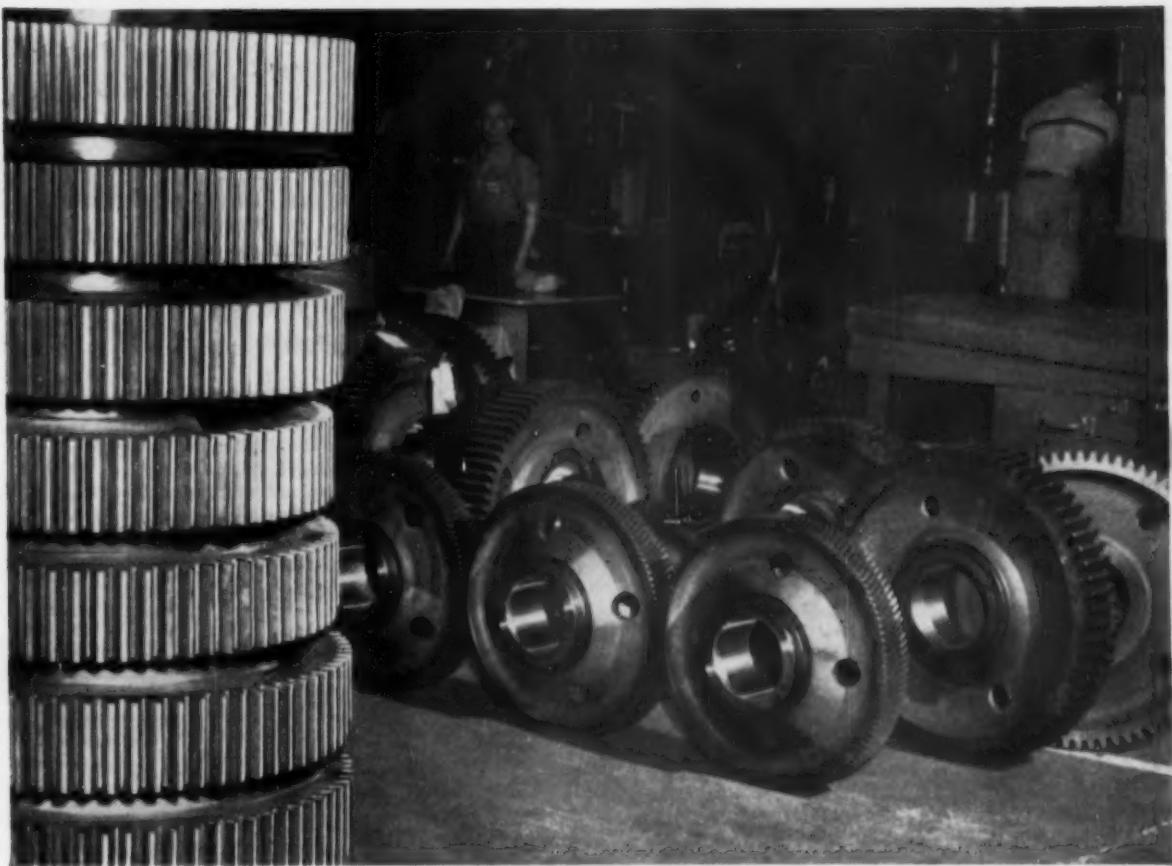
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BETHLEHEM STEEL



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EDITORIAL

Business Baiting Is Here Again	7
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NEWS OF INDUSTRY

*Special Report: Aircraft Market Beckons	39
*Expansion: Steel Makes Big Plans	42
*International: Russian Arms and Production	44
*Labor: Incentives for Indirect Workers	45
*Production: A Fine Year for Foundries	46
*Research: Is Commercial Atomic Energy Near?	47
*Government: A New Economic Barometer	48
Industrial Briefs	54
Personnel: Iron Age Salutes	69
Iron Age Introduces	71

NEWS ANALYSIS

Newsfront	37
Report to Management	53
Automotive Assembly Line	56
*This Week in Washington	61
*West Coast Report	65
*Machine Tool High Spots	67

TECHNICAL ARTICLES

*New Hot Tops Improve Ingot Yields	79
*Strip Coating Saves Refinishing Costs	83
*Reducing Costs on Tool and Die Repairs	86
*Machinable Titanium Billets From Scrap	90
*New Line Halves Black Oxidizing Costs	92
Dustless Floor Lowers Small Part Rejects	94
Technical Briefs	104

MARKETS & PRICES

*The Iron Age Summary—Steel Outlook	119
Steel Product Markets	120
Comparison of Prices	121
Iron and Steel Scrap Markets	122
Nonferrous Market	126
Steel Prices	129

REGULAR DEPARTMENTS

Dear Editor	9
Fatigue Cracks	11
Dates to Remember	13
Free Literature	96
New Equipment	112

INDEX OF ADVERTISERS

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The IRON AGE, published every Thursday, with an additional issue in June, by CHILTON CO. (INC.), Chestnut & Franklin Streets, Philadelphia 39, Pa. Entered as second class matter, Nov. 18, 1922, at the Post Office at Philadelphia, under the act of March 3, 1879. Prior to the mailing law industries only, or to persons actively engaged therein, \$8 for 1 year, \$8 for 2 years in the United States, its territories and Canada. All others \$15 for 1 year; other Western Hemisphere countries, \$18; other Foreign Countries, \$25 per year. Single copies, 50¢. Annual Review Issue, \$2.00. Cables: "Ironage," N. Y.

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Philadelphia 39, Pa.

NEWS DEVELOPMENTS

HOW TO TAP AIRCRAFT'S BIG BACKLOG — P. 39

Aircraft industry has \$8 billion annual sales, \$14 billion backlog. Defense spending is now steady, will continue at high level for jets and guided missiles. New commercial airline orders keep civilian business at a high percentage. Here's information on how to get some of the multi-million dollar supplier business, what items are needed, what skills are required.

STEEL EXPANSION WAVE GETS ROLLING — P. 42

Steel companies are laying billions on the line to step up their ingot capacity. A projection of an Iron Age survey indicates a probable increase of some 16 million tons in the next four years. But expansion spending increases the likelihood of selected price boosts to help pay the bill. Industry leaders are beating the drums for higher prices in the near future.

RED WAR MACHINE TAKES 25 PCT OF STEEL — P. 44

Nearly 25 pct of Communist steel production is going into armaments. The Reds are building up a vast rail network in the Far East, are strengthening shipyards, airfields. Leading steel exporter outside the Soviet orbit is Austria. West Germany will be Free Europe's leading steel producer this year.

INCENTIVE PAY HELPS INDIRECT WORKERS — P. 45

Small firm shows how incentive plan for indirect workers pays off. Indirect workers are those not actively engaged in production, making time study difficult. American Seating Co. develops method to provide basis for incentive pay. Results are lower costs, higher production, plus higher paychecks.

WEST WORRIES ABOUT PLANT DISPERAL MOVE—P. 65

West Coast industrialists want some clarification of the government's aircraft dispersal policy. Plants are standing by, geared up for production, ready to expand. They want to know what's going to happen. There has been talk of dispersal but no clear directive.

AUTOMATION TREND POSES QUALITY PROBLEMS—P. 67

President of the National Screw Machine Products Assn. says quality sometimes suffers in the push for quantity. He thinks we'd be better off being more careful, says automation processes should be evaluated on net acceptable production, not gross output.

IN METALWORKING

ENGINEERING & PRODUCTION

NEW HOT TOPS IMPROVE INGOT YIELDS — P. 79
A new, moldable exothermic material for hot top lining produces a sounder ingot and reduces metal losses to a minimum. Metal savings frequently exceed 10 pct. The new material can be used as a lining for conventional clay or cast iron top molds. Because it is moldable, it can also be formed into a sleeve for direct feeding of hot metal to the ingot mold.

STRIP COATING SAVES REFINISHING COSTS — P. 83
Flat-polished stainless strip coated with a resin-like film is formed into automotive trim parts that need 80 pct less refinishing than formerly. Production has been doubled. Spray coating is applied to the strip before it is roll-formed or stamped. The process eliminates the need for specially-padded racks to hold workpieces. Alkali cleaners easily remove the thin coating film after completion of forming operations.

REDUCING COSTS ON TOOL AND DIE REPAIRS—P. 86
Good tooling, designed with probable future maintenance in mind, is the key to low-cost tool and die repair. You might pay a bit more, but downtime for repairs on poor tooling is often far more costly.

MACHINABLE TITANIUM BILLETS FROM SCRAP—P. 90
Odd pieces of clean titanium sheet left over from fabricating operations need not be scrapped. They can be stacked and spotwelded to produce a small billet or nugget suitable for machining. Actual savings of the costly metal are reported by an aircraft maker.

NEW LINE HALVES BLACK OXIDING COSTS — P. 92
Redesigned facilities for coating small steel parts with black oxide has speeded processing considerably. Work which formerly required about 80 hours now takes 16 hours. Automatic control of solution level and concentration keeps the operation under control. Constant agitation produces uniform coatings free of deposits.

NEXT WEEK:

MECHANIZED HEAT TREATMENT—A GROWING TREND
Fully mechanized heat treating departments are a novelty no more. Industry finds them the logical addition to complete shop automation for maximum efficiency. No one system is universal. Often some ingenuity is called for. Most floor arrangements can be adapted to an integrated or dispersed pattern.

MARKETS & PRICES

STEEL FOUNDERS ARE PUSHING CAPACITY — P. 46
This will be one of the best peacetime years for steel founders. Outlook for 1956 indicates continued good business. Rail car boom is providing the push to increased shipments and bookings. High price of scrap cuts into profit, but inventories are adequate. Conversion enters picture for foundries with openhearts.

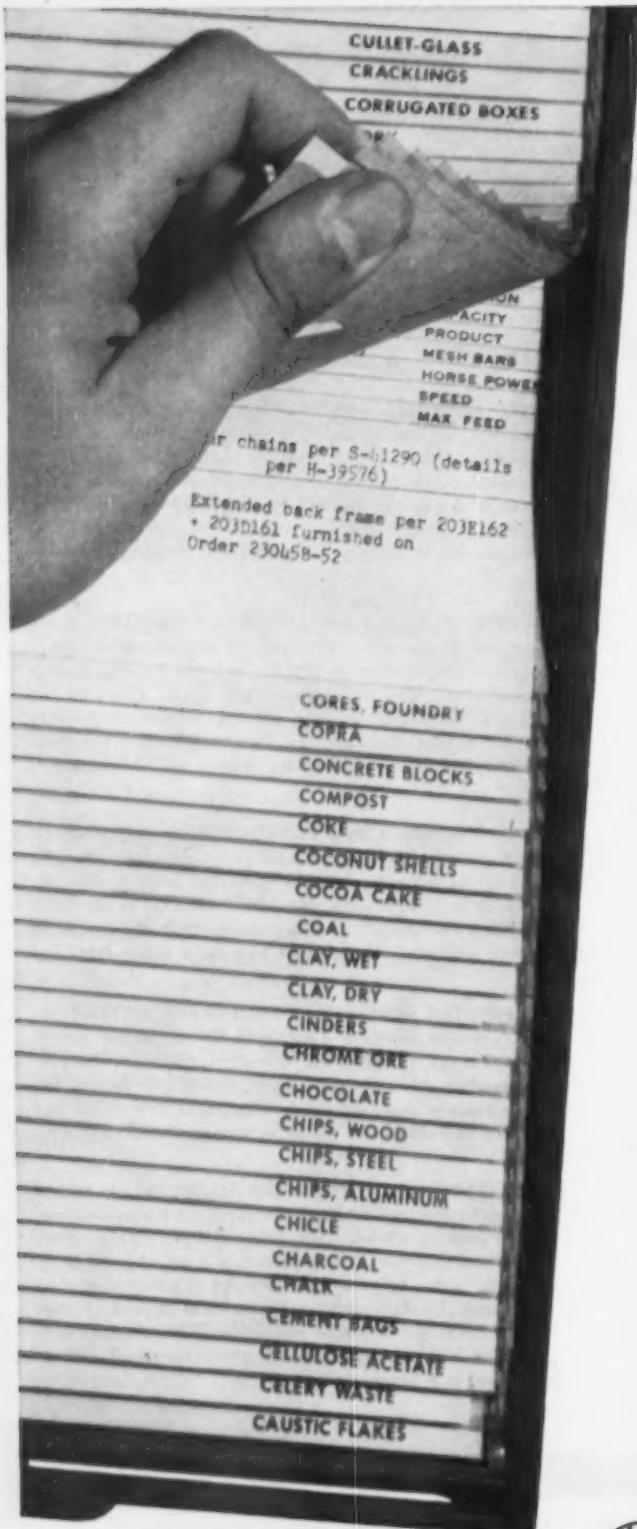
EXPERTS' OPINIONS ON ATOMS-FOR-INDUSTRY—P. 47
National Industrial Conference Board forum brought together authorities on the outlook for atomic energy in industry. The consensus: very good. But one big problem is that of finding trained manpower for the big job ahead. Bureaucratic red tape in dissemination of non-classified information comes in for criticism.

FLOW-OF-FUNDS: A NEW ECONOMIC BAROMETER—P. 48
After nine years of trial and error development, the Federal Reserve Board has come up with a new accounting system it calls Flow-Of-Funds. It is designed to follow movement of either cash or credit and thus furnish an accurate national economic barometer.

GOVERNMENT GOES AHEAD WITH SPACE SHIPS—P. 61
Contract specifications for about 12 satellites are in the works at Washington. First contract for launching equipment has gone out. Scientists figure the space units will go out within the next two years and provide valuable data on outer atmosphere conditions.

STEEL MARKET GOES FROM BAD TO WORSE — P. 119
The steel consumer can look forward to nothing but woe in the months ahead. Not only will supply be short until third quarter of '56, there's a good chance of an "interim" price boost to help pay for much-needed steel expansion. Production curtailments due to lack of steel are growing. Some public and private construction projects are being delayed. Steel procurement at almost any price is a fierce struggle.

WHAT WILL THE AFL-CIO MERGER MEAN TO YOU?
Will merger of the two big unions affect the behavior of locals your company deals with? Will merger mean a more effective political drive by labor? Next week's special report goes into these questions, discussing the future of Taft-Hartley, the outlook for a labor-minded Congress, and changes at the local level.



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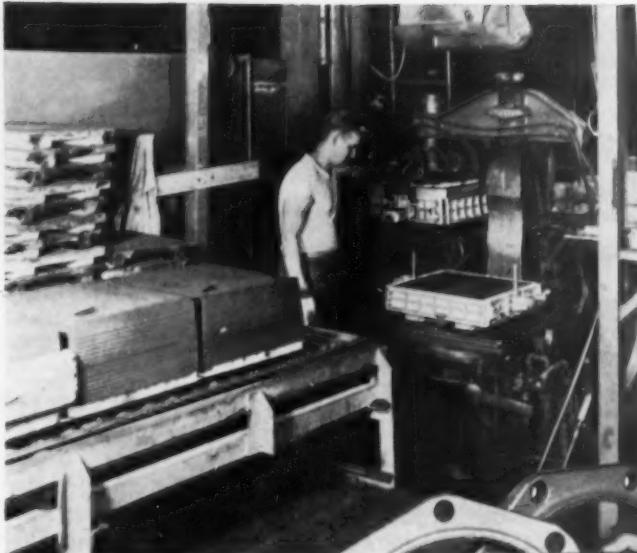
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Indexed in the Industrial Arts Index
and the Engineering Index.



Editorial:

Business Baiting is Here Again

♦ THE WHIPPING BOYS are being brought out again. The big show is on the road. It will soon have that aspect of "this is where I came in." But it must go on, as it always has, until the politicians have produced as many innuendoes as possible.

If it isn't the WOC (without compensation) businessman it's General Motors. And when the committee beagles get through wringing their hands over GM they will pick on steel. After that it will be aircraft—and so on far into the pre-election period.

Whatever the subject or whoever is on the griddle, the pitch is to make like John Q. Public is being robbed, mulcted or taken in. It's a pretty good show—as shows go. But there are signs that it may be going the way of burlesque or the one-night stands.

People riding around in a fairly good substitute for "happiness" are apt to yawn a little when GM is inferentially accused of robbing them. Those millions who own steel stock may nod a little in their sleep when steel tycoons are pictured as destroying the baby's milk fund.

The politicians need a new gimmick. It may be that there are too many capitalists in the U.S.A. today for the rabble rousing stuff to work as it did years ago. Business knowledge among the so-called masses is so widespread that it is hard to paint a picture of everyone being dispossessed by cruel industrialists.

Perhaps the businessman may be the last one to realize this. But more frequently he is giving a quick comeback to his political cross-examiner. A plain honest deadpan statement usually rings the bell. "Sure we charge higher prices, we have to if we want to remain in business" is better than a raft of economical gobbledegook with its charts and ineffectual time-consuming presentation. The inquisitor wants his drama with as few facts as possible.

The politicos will beat the whipping boy to a pulp in the coming months. There is no concrete proof that this increases votes or hurts business. Maybe this is the time for the witness to ask the "persecuting" attorney if he still beats his wife.

Strong, frank—loud if necessary—answers are needed from those on the whipping block. The gallery is with them, not against them.

Tom Campbell
EDITOR-IN-CHIEF



Cost-Cutting Chain Reaction Triggered by SPEED CLIP®!

Savings for the parts supplier, the television manufacturer and the ultimate user! That's the triple play that begins every time Centralab, division of Globe Union, Inc., Milwaukee, Wis., assembles a "Snap-Tite" television control. Here's why: There's a job-engineered Tinnerman SPEED CLIP in every control assembly.

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dear editor:**letters from readers****Sucked In?**

Sir:

Keep up your fine editorials like the one entitled, "Will We Be Sucked In Again?" in the November 3rd issue.

Our diplomats should not be lulled to sleep by Russian smiles nor by their honeyed words.

We should appraise the present rulers by their deeds—past and present.

If we do, I see little cause for rejoicing or complacency.

Let's keep our country strong. That is a fact the Soviets can understand. *Leo F. Reinartz, Middletown, Ohio.*

What Are You Afraid Of?

Sir:

C. A. Ruch, Manager, Employee Information, would like your permission to publish with full credit in the *Westinghouse News*—the fortnightly employee newspaper—the editorial in the October 6th issue of THE IRON AGE. He read it and was greatly impressed with the simple directness you used to hammer home one of the great fundamentals of our form of government—faith in yourself and your fellow men. *H. C. McDaniel, Manager Technical Information, Westinghouse Electric Corp., Pittsburgh.*

On Religion

Sir:

May I commend your valuable item "Religion: God and Work Go Together" in the October 27th issue.

It is indeed encouraging to see that business executives, who have been regarded as a particularly godless lot, are beginning to realize that the true source of all our basic strength is God and that every

phase of national security must be based on genuine heart-felt Christian ethics. *B. C. Vaughn, Metallurgist, Research and Test Dept., U. S. Naval Ordnance Plant, Indianapolis.*

Sir:

Your article, "Religion: God and Work Go Together" in the October 27th issue, states that a book of the entire proceedings at the recent meeting in Albany will be published. I would like a copy of this book as soon as it is available.

This meeting certainly covered a vital part of our business life which has been sadly neglected. *R. H. Larson, Vice President, Indiana Forge and Machine Co., East Chicago, Indiana.*

About January 15, 1956, you may secure a copy for \$3.00 by writing: Albany Diocesan Bookstore, 68 South Swan St., Albany 10, N. Y.—Ed.

Induction Heating Feature

Sir:

In THE IRON AGE issue of November 10th you feature "Induction Heating." Will you kindly send the writer two copies of this article. *Carl F. Joseph, Technical Director, Central Foundry Division, General Motors Corporation, Saginaw, Mich.*

Sir:

There are seven members of our industrial engineering faculty who teach either forging or foundry. Could we have a copy of the feature article "Induction Heating" for each member? If you will send these to me I'll see that the proper instructors get their copy. *C. A. Ellsworth, Instructor, Dept. of Industrial Engineering, The Pennsylvania State University, University Park, Pa.*

Copies are still available.—Ed.



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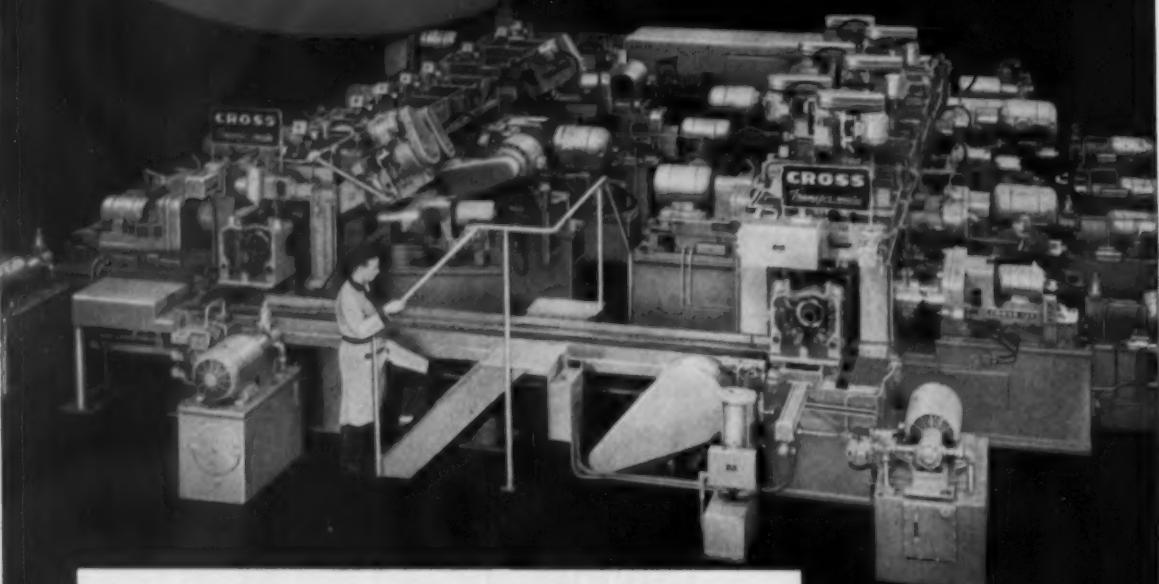
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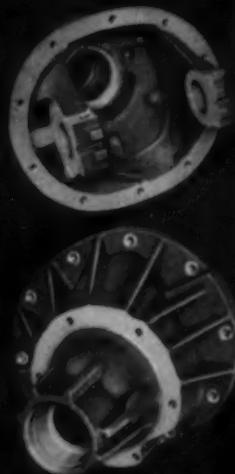
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fatigue cracks

by William M. Coffey

We are very happy to print here one of the most interesting letters we've received in many a long column. We recommend that you read it to its most fascinating end. It was addressed to our managing editor.

Dear Sir:

As you know, the birth of the iron industry was in Massachusetts and New England. It was almost at the time of the birth of this nation.

This baby industry proved at the time of the revolution to be the main factor in the successful culmination of the efforts of all the colonies.

There were at that time just 2 or 3 forges and furnaces in Connecticut operating the cold-blast furnaces producing 3 to 4 tons of iron per day which went into bars, strips, ship anchors, spikes, nails, etc. and cannon for the Revolutionary Army. From the cold-blast furnaces using charcoal as fuel came the hot-blast charcoal furnaces for years producing 15 to 16 tons of cast iron. The products of the cold-blast furnace were wrought. Eventually the hot-blast production was increased to 25 tons per day in these furnaces.

At the time of iron ore mining and charcoal iron production in 1922 not one single pig of the original cold-blast iron was to be had, and, careful search to produce any stray pig around old forge and furnace cities failed to produce the much sought after iron.

By a strange coincidence, I am the only living blast furnace operator alive, i.e., the last producer of the famous "Saleabury Charcoal Pig Iron." Just after the hurricane Diane struck, I went up to view the destruction caused by the flood. Walking along the bank I saw in the shallow water an object which on closer examination proved to be, as I thought, the long and unsuccessfully sought pig of cold-blast pig iron which I now have in my pos-

sition together with a spike made from the same material.

It is the only specimen in existence, a lonesome symbol of a closed era. Strange that I, the last one living, should be lucky enough to find it.

This pig's dimensions are as follows: 14 in. in length, 1½ in. thick, and 2 in. in width.

These measurements, it must be remembered, greatly facilitated handling and processing the iron in the then only existing hand forges wherein it was heated and hammered into bars, strips, etc., from which the Yankee produced nails, spikes, hinges, locks, shovels, tools, etc.

Within a short time I am by request bringing this pig to Waterbury to be put on exhibition so that all may see what pig iron of those days, which contributed so much to the happiness and well being, looked like.

The last firm to use "Saleabury Charcoal Iron" was the Farrell Foundry & Machine Co., of Waterbury, let for use in production of war material in World War II, which makes it possible to say it served our country in every war up to and including World War II.

No other iron has yet equalled or exceeded it in tensile strength, uniformity and depth of chill. Its strength is 2½ tons per sq in. greater than any other iron in the world.

Yours very truly,
W. T. Wallace

We sincerely hope you note that we have finally printed something worthwhile here in this column, right here.

Puzzlers

The field has a 4-ft high board fence. Each board is 11 ft long. There are just as many boards around this square field as there are acres in the field. How many acres?

unique in design — rugged in construction

GREEN PANTOGRAPH ENGRAVERS



THE FAMOUS
MODEL 106

The three-dimensional bench Model 106 cuts coats — engraves, routes, models and profiles, giving you expert results even by unskilled workers.



THE NEW HEAVY-DUTY MODEL D-2

The Model D-2 heavy-duty two dimensional Pantograph is a precision machine with a multitude of new features. Open on three sides, it permits complete freedom for engraving, milling, profiling large panels (up to 30' in diameter) or bulk pieces. Single, micrometer adjustment controls vertical depth of cut, automatically adjusting copy table with pantograph. Range of reduction ratios from 2-to-1 to infinity! Vertical range over 10 inches!

For further information, write to:
GREEN INSTRUMENT COMPANY
365 Putnam Ave. Cambridge, Mass.

Export Agent—Fritham Co., 33 W. 42nd St., New York 36
See us, Booth 548, Product'n Engin'g Show, Navy Pier, Chi.



One set-up saves 30%

Photos courtesy of the Kelman Electric & Mfg. Company, Los Angeles, California.

Boring, facing, and high speed drilling with one set-up cut the floor to floor time about one-third on this job.

The Kelman Electric & Mfg. Company say their Cincinnati Super Service Radial Drill "handles easily, is very accurate and versatile."

They are facing 6" diameters; drilling for $\frac{1}{2}$ " bottom tap, and tapping with a $\frac{1}{2}$ " bottom tap on this job.

The part being processed is a Bronze Top Casting.

Cincinnati Super Service Radial Drills are profit makers in this shop, and they could be in yours.

CINCINNATI
BICKFORD



RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

Subsidiary of GIDDINGS & LEWIS MACHINE TOOL CO. : Fond Du Lac, Wisconsin.

Write for Bulletin R-21C

dates to remember

NOVEMBER

THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS — Annual meeting, Nov. 27-30, Statler Hotel, Detroit, Mich. Society headquarters, 25 W. 45th St., New York.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION — Annual convention, Nov. 28-Dec. 1, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

EXPOSITIONS 1955

25TH EXPOSITION OF CHEMICAL INDUSTRIES—Dec. 5-9, Commercial Museum & Convention Hall, Philadelphia. Society headquarters, 480 Lexington Ave., New York.

1956

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

DECEMBER

SOCIETY FOR APPLIED SPECTROSCOPY—Regular meeting, Dec. 6, Hotel New Yorker, New York City. Society headquarters, Johns-Manville Research Center, Manville, N. J.

AIME—13th annual electric furnace conference, Dec. 7-9, William Penn Hotel, Pittsburgh. Society headquarters, 29 West 39th St., New York.

THE MATERIAL HANDLING INSTITUTE—Annual meeting, Dec. 12 & 13, Statler Hotel, New York City. Society headquarters, 813 Clark Bldg., Pittsburgh.

JANUARY

INSTITUTE OF SCRAP IRON & STEEL, INC.—Annual convention, Jan. 3-6, Hotel Sherman, Chicago. Society headquarters, 1729 H. St. N.W., Washington, D. C.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC.—Annual meeting, Jan. 9-12, The Sheraton-Cadillac Hotel and Hotel Statler, Detroit. Society headquarters, 29 W. 39th St., New York.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Winter meeting, Jan. 18-19, Hampshire House, New York City. Society headquarters, 600 Fifth Ave., New York City.

COMPRESSED GAS ASSN., INC.—Annual meeting, Jan. 23-24, The Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

TRUCK-TRAILER MANUFACTURERS ASSN.—15th annual convention, Jan. 23-25, Edgewater Gulf Hotel, Miss. Assn. headquarters, 1042 National Press Bldg., Washington, D. C.

PLANT MAINTENANCE & ENGINEERING SHOW—7th annual conference, Jan. 23-26, Convention Hall, Philadelphia. Society headquarters, Clapp & Polick, Inc., 341 Madison Ave., New York.



Signode unitizing method speeds truck handling of heavy castings

A manufacturer in Alabama sought a safer, lower cost way to ship heavy-wheel castings by motor truck to Michigan. With the co-operation of Signode's fieldman, a special unitizing pallet pack was developed. First, a heavier, stronger pallet was built. Two layers of castings, separated by a wood frame, and similarly capped, were strapped to the pallet. Six bands of Signode steel strapping, spaced for maximum unitizing efficiency, were applied. The new method of shipping saved time in loading and unloading. Handling safety was greatly increased. Cost of the pallets was self-liquidating, because the receiver bought them for inplant handling and storing of castings, and for intraplant shipping.

Get in touch with your Signode Fieldman! He will be able to show you, too, how to make important savings in packaging, handling and shipping your products through the six basic unitizing methods. Quickest way to reach him is to write

SIGNODE Steel Strapping Co.

2623 N. Western Ave., Chicago 47, Ill.
Offices coast to coast—Foreign subsidiaries and distributors world-wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto



MEN IN COMMAND

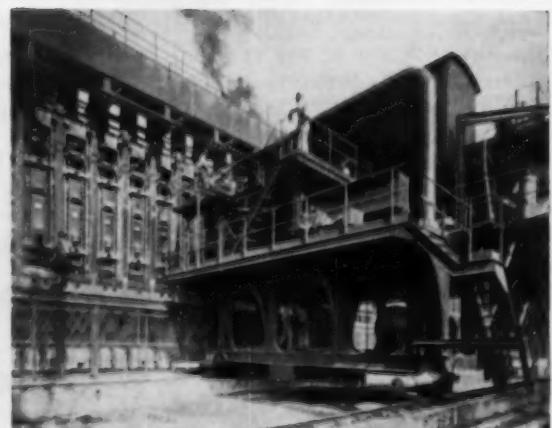


FOR THE

Installation photos — courtesy of
Jones & Laughlin Steel Corporation.



With minimum maintenance, EC&M LINE-ARC Contactor Control has operated this Ore Bridge for several years.



EC&M TIME-CURRENT Control excels for Coke Pushers,
Door Machines and Larry Cars.

PREFER EC&M

Industry production rates are higher today than ever before. Men and machinery are being put to severe tests. Because of this, men in command are relying on EC&M control for the BIG jobs in steel.

EC&M is prepared to engineer control equipment for your cranes, mill drives and other production operations . . . control equipment that will minimize down time . . . equipment that will guarantee you dependable and precision performance. When planning expansion or modernization programs, specify EC&M equipment.

THE ELECTRIC CONTROLLER & MFG. CO.

4498 Lee Road

Cleveland 28, Ohio



6077



On B.F. Skip Hoists, EC&M Control gives high output with maximum dependability.



Pit Crane, EC&M Controlled, keeps blooming mill supplied for top capacity.



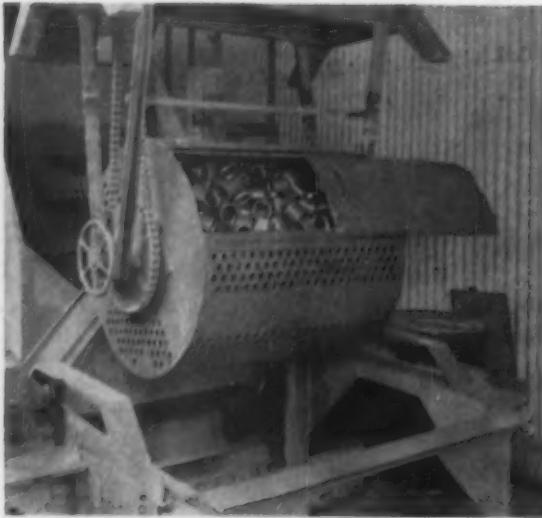
Traveling Tilting Tables with EC&M TIME-CURRENT Control.



Crane over Blooming Mill uses EC&M Wright Lowering Circuit . . . famed for safety and simplicity.



EC&M Control provides greater safety for Hot Metal and Ladle Cranes . . . and Charging Machines.



This WELDCO Drum Pickler holds up to 1200 lbs. of couplings or small parts.

At Wheeling Steel's Benwood Works

WELDCO

Mechanical
DRUM PICKLERS

Give **Fast, Uniform, Low-Cost Pickling**

Are you pickling small parts, stampings, forgings, or castings? Then your plant needs the fast, efficient, uniform action of a WELDCO Mechanical Drum Pickler.

Wheeling Steel Corporation, for instance, installed 7 WELDCO Monel Picklers in their new coupling department over a year ago, and report substantial savings already: (1.) The pickling operation is now continuous. (2.) Pickling time has been cut 50% to 60%. (3.) Output has been increased to 6000 lbs. per hour. (4.) Labor cost, and acid consumption per ton, have been considerably reduced.

These WELDCO Drum Picklers provide a stirring, rolling, tumbling action, giving better, more uniform, more efficient, faster pickling. The parts inside the drum are constantly moving and rotating, with all surfaces equally exposed to the acid. That's especially important in Wheeling's case because the material, after pickling, goes directly to the Galvanizer, and the cleaning must be thorough and uniform.

WELDCO's superior design and construction guarantee a good pickling job every time . . . and Monel's corrosion-resistant qualities mean years of service with no maintenance or replacement problems. Let WELDCO's pickling specialists show you how to save time and money with a Mechanical Drum Pickler. A letter or phone call brings a WELDCO engineer to your plant with all the facts!



One of Wheeling's 7 WELDCO Drum Picklers, used for pickling couplings.

WELDCO

THE YOUNGSTOWN WELDING & ENGINEERING CO.
3723 OAKWOOD AVE. . . . YOUNGSTOWN 9, OHIO



2,692-ton bridge "see-saws" on four edges of USS "T-1" steel!

The main arch of the Ninth Street Bridge at Wheeling, W. Va., stretches 580 feet over the Ohio River. The entire weight of this 2,692-ton span rests on 4 thin edges of USS "T-1" steel.

This main span has four arch shoes, each supporting 673 tons. At the greatest point of stress in each shoe is a thin plate of "T-1" steel, machined to a shallow edge. "T-1" steel was chosen because it has a minimum yield strength of 90,000 psi, and long life under extreme atmospheric conditions.

On bridge jobs of all types, use "T-1" steel where very high stresses are involved and where you need weldability without pre- or post-heating. "T-1" has excellent impact resistance at low temperatures. Its very high strength (105,000 psi minimum) makes it ideal for gusset plates, structural members and other component bridge parts.



673 TONS



THE ENTIRE MAIN SPAN rests on four cast iron arch shoes like this. Two plates of "T-1" steel are pressed into the heart of each shoe at the contact point. "T-1" steel's 90,000 psi yield strength enables it to withstand the high stress.

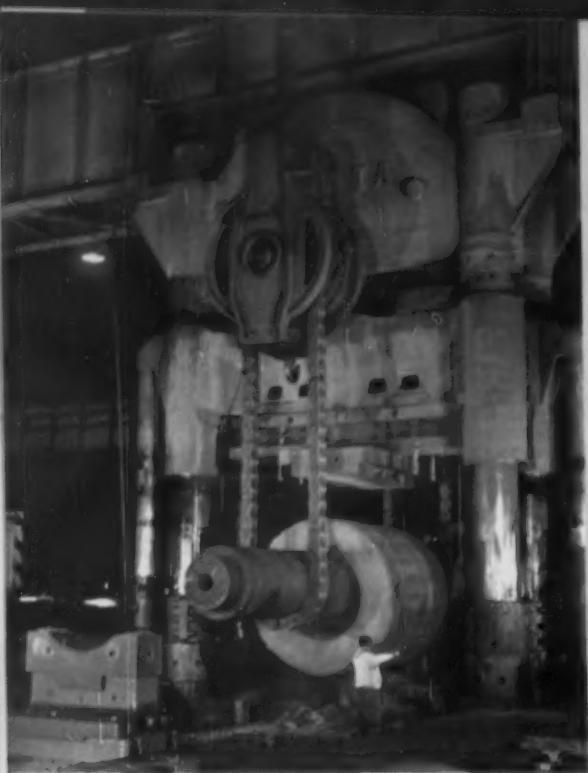
LIKE A "SEE-SAW." As the bridge expands laterally, the upper shoe rocks over slightly to relieve expansion stress. The plate in the lower expansion shoe has been machined to an edge and acts as a fulcrum for the rocker movement of the upper shoe. At this point the "T-1" steel supports a load of 673 tons.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

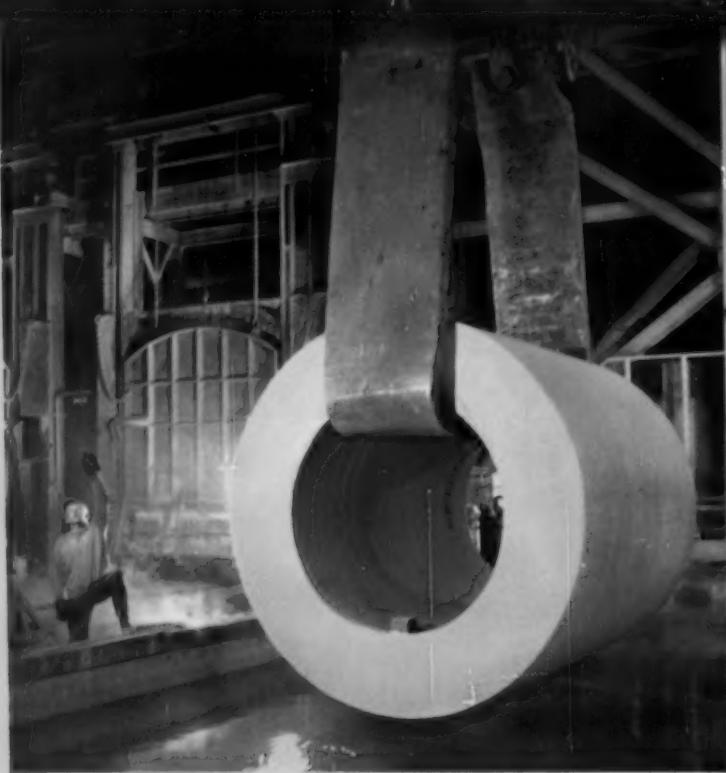
USS "T-1" CONSTRUCTIONAL ALLOY STEEL



UNITED STATES STEEL



Here, one of the cylinders is being forged on the 7,000-ton press. Masterful work on the mandrel and precision manipulation of the press provide proper thickness/diameter ratio.



The cylinder (largest of its kind ever forged) is about to be lowered into the water quench tank after heat treating.

GE gets ready to make some big crashes

General Electric's Large Steam Turbine-Generator Department recently installed a high-speed burst pit to investigate the bursting characteristics of wheels and rotors. Model forged turbine and generator shafts and other partial and full scale parts will be spun at speeds up to 25,000 rpm or until they burst.

The big burst pit includes two concentric forged steel cylinders, made by the Homestead Forgings Division of U. S. Steel. These 60-ton cylinders must possess a strength that almost defies description because tremendous forces are at work here.

Imagine 200 automobiles traveling 100 mph crashing simultaneously. These U. S. Steel Quality Forgings have been designed to absorb that same amount

of energy (200 million foot pounds).

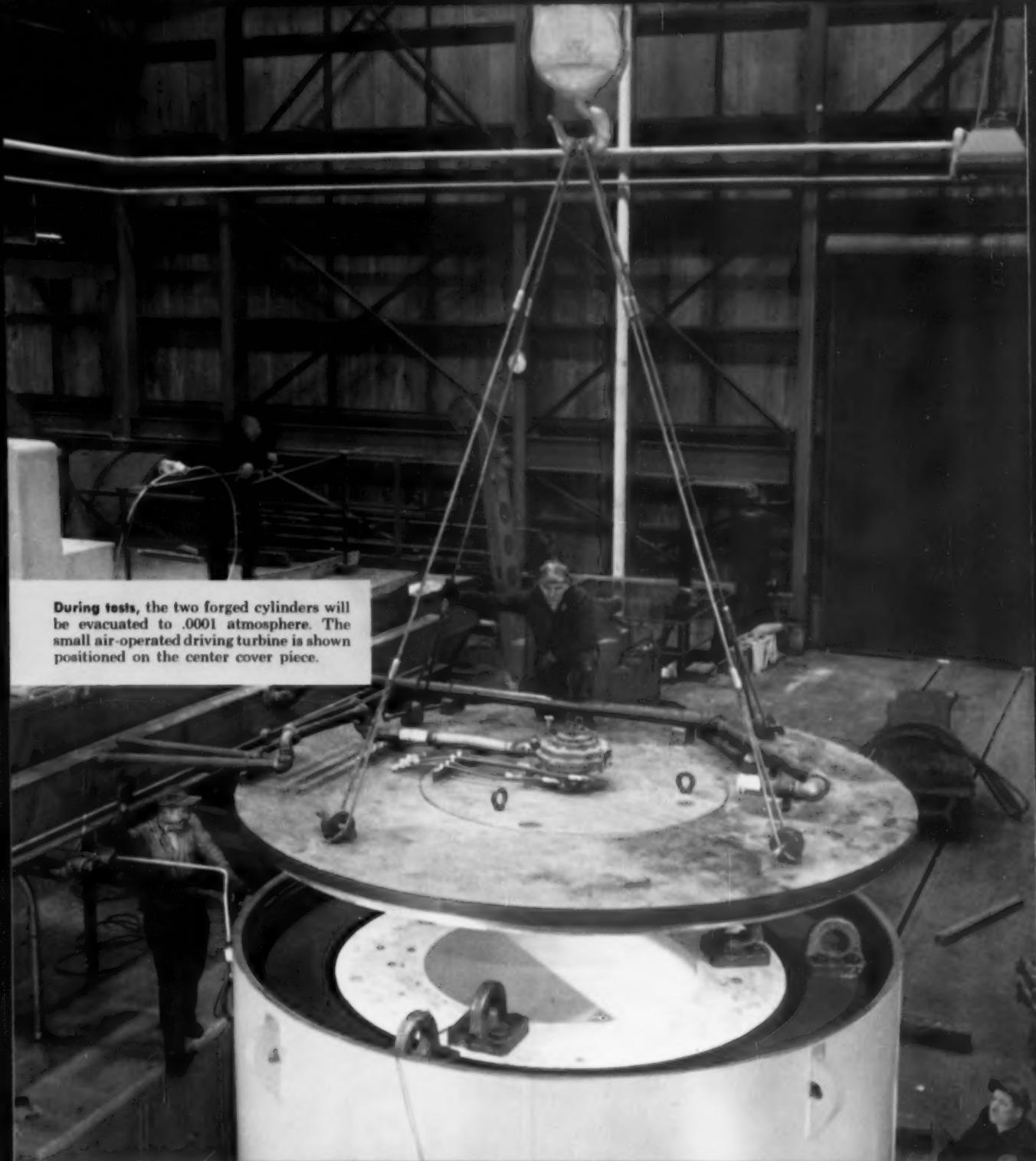
With this testing facility, General Electric engineers expect to learn new things about material strength and rotor design which will permit building ever-better turbine-generator units to keep up with the demand for low-cost electric power.

U. S. Steel's Homestead Forgings Division produces a complete range of high-quality forgings, including turbine-generator shafts, heavy machinery parts, and giant sleeves like GE is using in this burst pit. We solicit your inquiries or requests for our free booklet on USS Quality Forgings. Just write to United States Steel, 525 William Penn Place, Room 4799, Pittsburgh 30, Pa.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

U N I T E D S T A T E S S T E E L

UNITED STATES STEEL



During tests, the two forged cylinders will be evacuated to .0001 atmosphere. The small air-operated driving turbine is shown positioned on the center cover piece.

U.S.S.
Quality
FORGINGS

heavy machinery parts—carbon, alloy, stainless

forged steel rolls and back-up roll sleeves

electrical and water wheel shafts

hammer bases and columns



HIGH TEMPERATURES and severe thermal shock call for furnace arches that can take it. Plant engineers find that refractory concrete furnace arches made with Lumnite calcium-aluminate cement give long, trouble-free service, yet cost less than other types.

"Now we get three forge-furnace arches for the price of one!"



NEW ARCH BEING PLACED at large midwestern forge plant. This company is enthusiastic about the outstanding service given by refractory concrete arches made with Lumnite.



FABRICATED METAL MOLDS in three sizes are used by this forge plant to cast arches for 55 of their furnaces. Refractory concrete arch sections are easily precast and stored for future use... eliminate costly fitting problems.

"We reduced the cost of furnace arches 65% by casting them of refractory concrete made with Lumnite* cement," reports the plant engineer of a leading forge plant in the Chicago area.** "Refractory concrete arches have given us excellent service—even in periods of extremely heavy production when temperatures soared."

Easily cast in wooden or steel molds, pre-cast monolithic arch sections save installation time by eliminating costly fitting. They give long, trouble-free service, too, because there are no small units to work loose.

You'll find many other time- and cost-saving uses for refractory concrete made with Lumnite calcium-aluminate cement and suitable aggregates in your plant. Keep a supply of Lumnite cement or prepared Lumnite-base castables on hand for emergencies. Castables are packaged mixes of Lumnite cement plus aggregates selected for specific temperature and insulation needs—made and distributed by leading manufacturers of refractories. Write today for information about industrial concretes made with Lumnite cement.

UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL  CORPORATION SUBSIDIARY
100 PARK AVENUE, NEW YORK 17, N. Y.

Offices: Albany • Birmingham • Boston • Chicago • Dayton • Kansas City
Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco

*"LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

**Name on request.

B-L-110

Atlas[®] Lumnite Cement

FOR INDUSTRIAL CONCRETES
REFRACTORY • INSULATING • OVERNIGHT • CORROSION-RESISTANT

MONSANTO
PROFIT
PICTURES

High-strength shell, bonded with Resinox 736, is stripped from the pattern plate.

This foundry gets stronger, non-warping molds with **Resinox 736**

**MONSANTO PHENOLIC RESIN SELECTED
BY LYNCHBURG FOUNDRY AFTER INTENSIVE
LABORATORY TESTING**

"Resinox 736 has proved itself to have the characteristics needed to meet our exacting shell molding requirements," according to Harvey E. Henderson, research metallurgist of the Lynchburg Foundry Company, Lynchburg, Va.

This Monsanto resin, which was developed specifically for precision shell casting, has also enabled Lynchburg Foundry to reduce the problem of warped shells.

Resinox 736 also has the hot strength necessary to prevent metal from penetrating into the mold. This

holds finish-grinding of castings to a minimum.

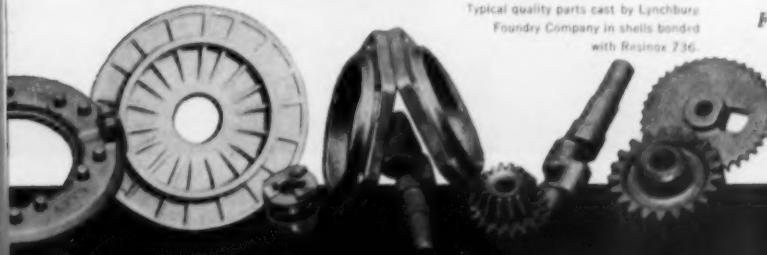
"With the Monsanto material, we are now getting castings with excellent surface. They are exceptionally clean, good looking and uniform," Mr. Henderson states. "This good finish plays a vital part in obtaining the close dimensional tolerances needed, and has greater sales appeal with our customers."

Lynchburg is one of a long list of foundries in which Monsanto resins are giving outstanding performance. For shell molding, core binding or sand conditioning resins that are research-developed and shop-tested to meet your foundry needs, write first to Monsanto Chemical Company, Plastics Division, Dept. IA-11, Springfield 2, Mass.

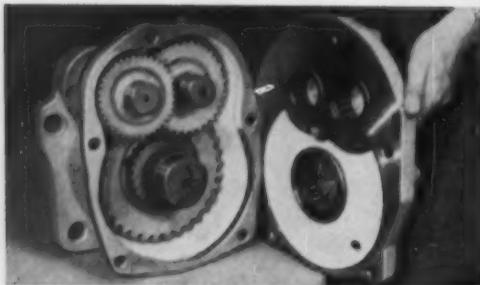
Typical quality parts cast by Lynchburg
Foundry Company in shells bonded
with Resinox 736

For stronger shell molds, specify

RESINOX®



How you can put hundreds of



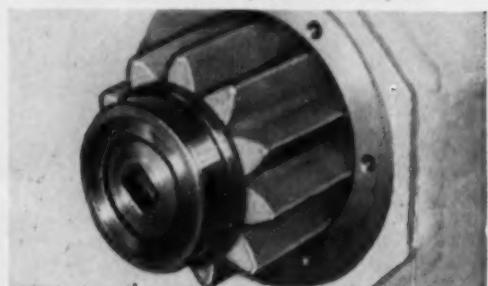
Gear Box Gears—Republic 4320H and 4820H Alloy Steels



Transfer Case Pinion—Republic 4820H Alloy Steel



Transfer Case Ring Gear—Republic 4820H Alloy Steel



Final Drive Pinion—Republic 4820H Alloy Steel



horsepower to work with safety

LeTourneau-Westinghouse does it with the help of Republic Alloy Steels on the Model B Tournapull. This high-speed, self-propelled scraper is designed to carry 23 yards of earth at speeds up to 28 miles per hour.

Republic Alloy Steels are used in this giant for final drive pinions, transfer case ring gear and pinion, gear reduction box gears and pinions, and electric motor pinions.

Alloy steels provide an outstanding combination of qualities essential to safety in designing equipment to carry heavier loads at higher speeds. In these fine steels you will find highest strength values—plus an unusually high strength-to-weight

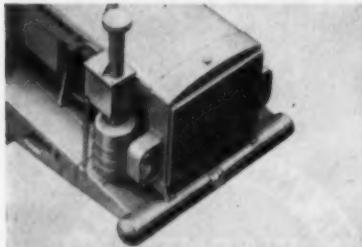
ratio that permits transmission of hundreds of horsepower through tough, strong gears and shafts free from excessive weight.

And when you add to these qualities uniform hardness, that means reduced wear—plus resistance to fatigue, shock, stress and temperature extremes—you have a material with the ability to insure safety, extend equipment life, and to cut maintenance and replacement costs.

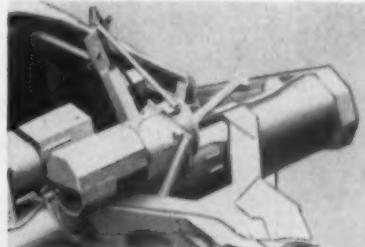
Republic—world's largest producer of alloy steels—is ready to assist you with metallurgical and engineering assistance in the most efficient and economical application of these fine steels to your product. The coupon will bring you more information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products



ANOTHER REPUBLIC PRODUCT. Electric Resistance Weld Steel Pipe, is used for the front bumper on the Model B Tournapull. Both this type and Continuous Butt Weld Steel Pipe have been serving industry for years in all types of applications. Today they are better than ever. They have many mechanical applications, like the one shown above, in addition to being used for transmission of gas, water, steam.



PINS, BRACES AND REINFORCEMENTS on the Model B Tournapull are made from Republic Hot Rolled Carbon Bars. Countless forging and general manufacturing companies look to Republic as a dependable source for hot rolled steel bars. Rounds, squares, hexagons, octagons and flats are produced in all grades of carbon, alloy and stainless steels. Republic also supplies hot rolled special sections for economical mass production of steel parts.



REPUBLIC COLD FINISHED CARBON BARS are used by LeTourneau-Westinghouse for cap screws and bolts. Cold drawing gives steel parts higher strength, greater uniformity and a bright, smooth finish. Republic's Union Drawn Division supplies high-quality cold finished bars in all standard and special carbon, alloy and stainless analyses. And to get the most out of these steels, Republic offers you the services of expert metallurgists and machining specialists.



REPUBLIC STEEL CORPORATION
3104 East 45th Street
Cleveland 27, Ohio



Please send more information on:

- Alloy Steels Steel Pipe
 Cold Finished Bars Hot Rolled Bars

Name. _____ Title. _____

Company. _____

Address. _____

City. _____ Zone. _____ State. _____ G-6667

TWO NEW CONTOUR ATTACHMENTS FOR WARNER & SWASEY TURRET LATHES



Available on Warner & Swasey No. 5 (M-2250)

Universal Turret Lathes (top) or Warner & Swasey

2-A Universal Turret Lathes (bottom).

Fast, Accurate Contour Turning and Facing. Curves, tapers and radii can now be machined in less time with simpler, less expensive tooling. Even both sides of the spindle center can be machined when contour facing. Low setup time means you can profitably run small as well as large lots.

Retains Turret Lathe Flexibility. Hydraulic tracer unit is mounted at the rear so additional operations can be performed from both hex and square turrets on contouring setup. Eliminates many secondary turning operations. When not in use, normal

turret lathe work can be performed.

Separate Rough and Finish Contour Cutters. Manually controlled, hydraulically operated, two-position tool turret for rough and finish cutters. Cutters can be easily set to finish size by micrometer adjusting screw with easy-to-read dial. It has 3 leaf-type stops which permit up to 4 roughing cuts to be taken prior to finish cut without adjustment or changing cutter settings.

Adjustable and Accessible Template Mounting—uses flat templates for facing, and first piece or flat tem-



plates for turning. Templates are mounted on a rigid overhead support. Micrometer screws are provided for fast, accurate template adjustment for faster setup.

Instantaneous Tool Slide Response. Tracer slide is actuated by a powerful, direct-acting hydraulic cylinder with a long piston stroke. Extremely sensitive tracer slide response assures accurate reproduction of the template form. Metal removal rate is limited only by the cutter used.

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN



Reporting new developments in copper-base alloys and metalworking methods.



Solid Brass Fireplace Equipment Gives Beauty More Than Skin Deep

Simple decorating trends, calling for warm, rich color accents, are enhanced by solid brass fireplace equipment in modern homes. For high quality fireplace fixtures such alloys as Bridgeport Yellow Sheet Brass have added advantages in ease of fabrication.

Wilshire Manufacturing Co., of Los Angeles, large producer of quality fireplace screens and accessories, asked Bridgeport Technical Service to recommend alloys that would meet Wilshire's rigid product requirements and still work satisfactorily in widely varied manufacturing operations. Specifications were reviewed from standpoints both of production and the basic objectives—quality products with good color characteristics and bright, enduring finish.

To achieve top quality an alloy of uniform fine grain structure was specified. Comprehensive tests established Bridgeport Yellow Brass Sheet as meeting every requirement. Variations in temper were recommended to facilitate the many different forming operations.

An important factor was that the sharpness of intricate filigree patterns used on firescreens and stands depends upon exact, uniform metal tempers. Excessive hardness dulls tools; softness causes ragged patterns and increases the number of rejected pieces.

Ductility proved essential in stamping firescreen feet, a process which stretches as well as compresses metal. Alloys must not crack, tear or fail on the sharp bends.

Wilshire has made wire weaving a fine art by developing a unique process which produces attractive, flexible screening. Here too, product quality was found to depend largely on the physical characteristics of the wire—proper tempering, dimensional accuracy and consistent conformity with manufacturer's specifications.

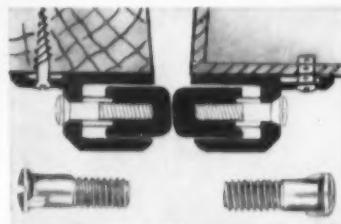
Product and production studies like these, made by Bridgeport's metal experts over the complete range of Wilshire's operations, resulted in specialized metallurgical recommendations covering all phases of manufacturing and materials requirements. In every case the Bridgeport alloys were exactly suited to Wilshire's varying production techniques for manufacturing wood baskets, shovels, screens, frames, legs, handles, and filigreed parts. In addition, Wilshire benefits from Bridgeport's pre-shipment materials inspection and quality control.

Any manufacturer looking for practical ways of maintaining, or improving product quality, can call on Bridgeport's Technical Service for experienced advice. Local Bridgeport offices make all the arrangements.

Corrosion-Resistant Silicon-Bronze Screws Help Astragals to Exclude Wind and Weather

Physical properties of small parts can make big differences in the satisfactory service of assembled products.

Typical are the specially made screws of Bridgeport Silicon Bronze in adjustable astragals fitted to doors as weather strips and stop beads. Despite wear, weather, expansion and contraction, they enable flexible weatherstrip edges to exclude dirt, dust and drafts.



These screws are cold-headed by Time Screw & Manufacturing Corp., of Rockford, Ill., and are installed in extruded bronze astragals made by The Michaels Art Bronze Co., Covington, Ky.

All types of exterior doors must close tightly against weather and drafts. Adjustment must be easy when necessary. All materials must resist corrosion.

The screws, spaced 10 inches apart on a flexible edge held on the fixed member, have oval heads with two small lugs. The lugs, meshing into grooves in the fixed member, prevent vibration and loosening as the screws tension the edge against a steel spring.

Cold-headed from Bridgeport Silicon Bronze 609, these screws exemplify careful materials selection, matched with physical and end-use requirements. Physical properties of 609 satisfy severest demands. Cold-working properties simplify machining, reduce production cost.

Possessing the strength and toughness of mild steel and highly resistant to corrosion, 609 is approximately 98% copper and 2% silicon. This alloy is well suited to exposed installations.

When physical requirements are critical, Bridgeport alloys such as Silicon Bronze 609 often are recommended. These alloys can meet your production requirements, reduce manufacturing costs and contribute to greater product quality.

(4388)



BRIDGEPORT BRASS
COMPANY • BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn.
Indianapolis, Ind., and Adrian, Mich.
Sales Offices in Principal Cities—
Conveniently Located Warehouses

people at the machine



tool show compared

... AND SAW WHY

IT COSTS LESS TO RUN A DANLY PRESS

Manufacturers, engineers, machine tool users and industrial leaders from all parts of the world watched Danly Presses and equipment operate at the Machine Tool Show in Chicago. They saw working demonstrations of Danly operational features . . . inspected advanced Danly design and construction . . . found out first-hand why increased production costs less with Danly Presses.

The Danly Autofeed Press exhibited represents the most advanced thinking in high-speed stamping press design . . . duplicating the actual results you can expect in your own plant. Vibration-resistant construction, built-in press controls, operator and press safety devices built into this press result in direct savings in maintenance and operating costs. Machine tool precision and substantially heavier con-

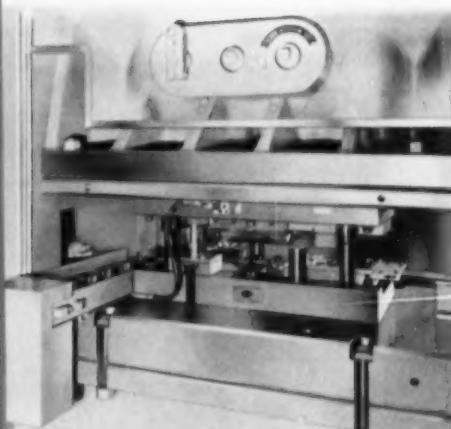
struction throughout are basic reasons why Danly Autofeed Presses will give you greater production from your progressive dies . . . why this exhibition press turned out stampings from a seven station die at the rate of over 3,000,000 per month. This figure represents the number of rifle clips actually being produced, month after month, in a production plant from an identical die on a similar Autofeed Press.

These same Danly advantages will produce substantial savings in your operations. Use the comparison list shown here to check Danly Presses, feature for feature, against all other presses. Discover for yourself why Danly Presses mean increased production at lower operating costs. Talk to a Danly engineer soon.

Write for the completely new Danly Autofeed Press Catalog now!



WHY DON'T YOU COMPARE DANLY PRESSES,
FEATURE FOR FEATURE, WITH ALL OTHER PRESSES ON THE MARKET?

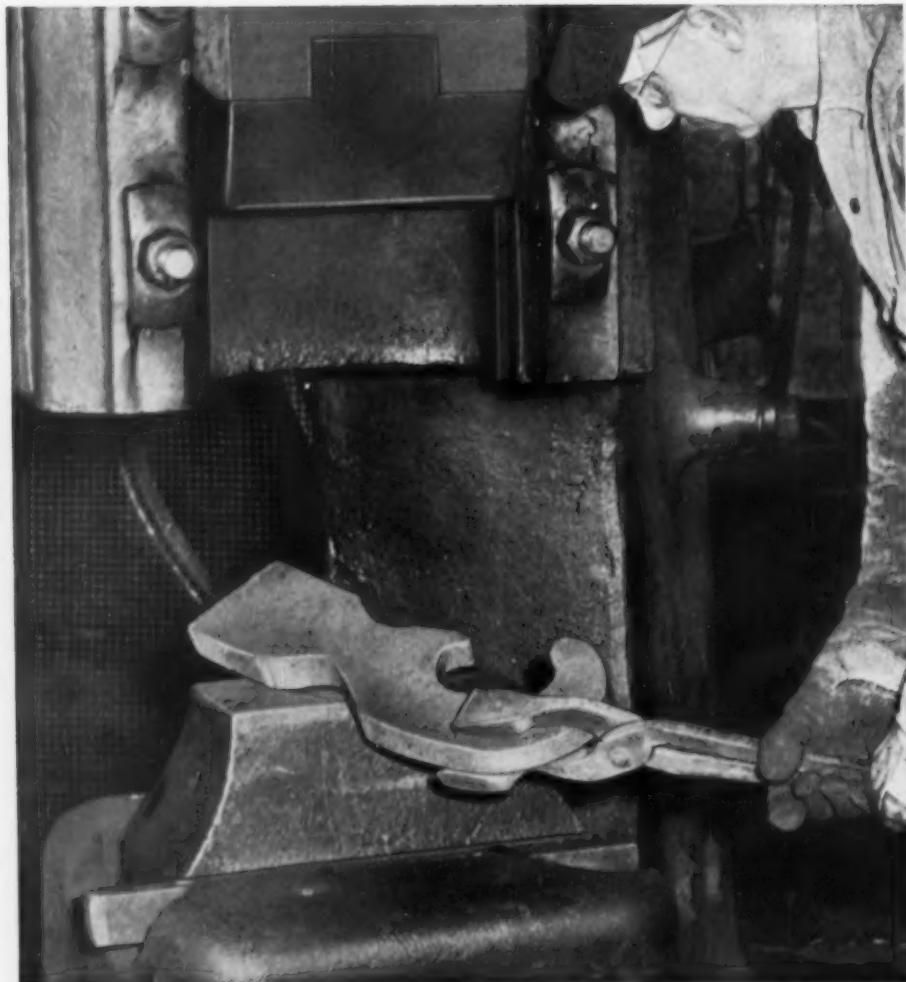


THIS IS THE SEVEN STAGE PROGRESSIVE DIE THAT PRODUCES RIFLE CLIPS AT THE RATE OF OVER 3,000,000 A MONTH. EXTREMELY CLOSE ALIGNMENT OF OIL LUBRICATED SLIDE GIBS AND EXTRA-RIGID CONSTRUCTION OF DANLY PRESSES PROTECT DIES SUCH AS THIS, ASSURING LONGER LIFE.

COMPARE	FEATURE	DANLY	OTHER
PRECISION	Machine tool precision in manufacture and assembly plus adequate lubrication assure smoother operation, longer life.	✓	
INSTALLATION COSTS	Danly presses are delivered already "run-in" tested. Assembly and operation in the Danly plant means fewer adjustments, faster installation.	✓	
DRIVE	Danly's cool-running clutch lasts longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.	✓	
CONSTRUCTION	Extra-heavy construction reduces vibration and deflection. Dies last longer, presses stand up under severest duty.	✓	
LUBRICATION	Danly features completely automatic oil lubrication including slide gibs. Should any vital bearing not be sufficiently lubricated, safety switch stops press and indicates the source of trouble.	✓	
MAINTENANCE	Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.	✓	
CONTROLS	Controls designed and built by the press manufacturer assure the user of undivided, one-source responsibility for control and press performance on the production line.	✓	

DANLY

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue • Chicago 50, Illinois



Forging Monel hook

Monel alloy is easy to form by standard cold or hot working techniques. It is readily welded, too.

This is the way to get a strong, dependable pickling hook . . . with forged Monel

When you want to handle big pickling loads safely, nothing takes the place of a forged Monel* alloy hook.

Monel nickel-copper alloy is easily the strongest of all common metals suitable for pickling . . . fully as strong as alloy steel. Forging makes it even stronger. Up to 20% more payload is not unusual for Monel devices.

What's more, this natural strength *stays in*. You can depend on it. Monel stands up in sulfuric, hydrochloric and even hydrofluoric acid solutions. Washing or degreasing solutions, too. Often Monel hooks last 15 to 20 years in these services.

So do chains, eyebars, pickle pins, tie-rods, pipe and other pickling accessories made of wrought Monel.

Monel pickling devices plentiful

Youngstown Welding and Engineering, Youngstown, Ohio, for example, stocks forged Monel hooks and other standard accessories. They are equipped, too, to make up special fixtures in Monel alloy . . . devices such as those shown in a useful new 32-page picture booklet, "Equipping the Pickle House for Greater Production at Lower Cost." For a copy of this booklet, write:

*Registered Trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street
New York 5, N. Y.



For longer chain life, here's less bushing and joint wear



Large-diameter rollers of Link-Belt SS chains reduce chain-pull due to frictional resistance.

LINK-BELT SS roller chains are designed for abrasive, heavy-duty service

FOR hard-working drives and conveyors, choose Link-Belt SS bushed roller chain. Its hardened steel joint assures longer life in gritty and abrasive applications. Accurately machined parts provide a firm, tight fit of pins and bushings in the steel sidebars. In addition, accurate control of raw material specifications and manufacturing processes results in uniformity...longer life.

Whatever your particular chain requirements in regard to speed, weight of loads or severity of service—the completeness of the Link-Belt line will provide the right answer. No other manufacturer offers such a broad range of silent and roller chains—of cast, combination, forged and fabricated types. And a complete selection of attachments permits efficient adaptation to varied services.

For help with any chain problem—big or small—call your local Link-Belt office or authorized stock-carrying distributor. He is qualified to make an unbiased recommendation of the one chain best-suited to your exact needs.



Link-Belt Class SS roller chain assures steady, even flow of fabricated products from medium-temperature industrial oven manufactured by The W. W. Sly Manufacturing Co., Cleveland, Ohio. Link-Belt precision steel roller chain and roller bearing blocks are also used.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

11-609

Looking for the **BEST** chain
for a specific need?
LINK-BELT makes the *complete* line.

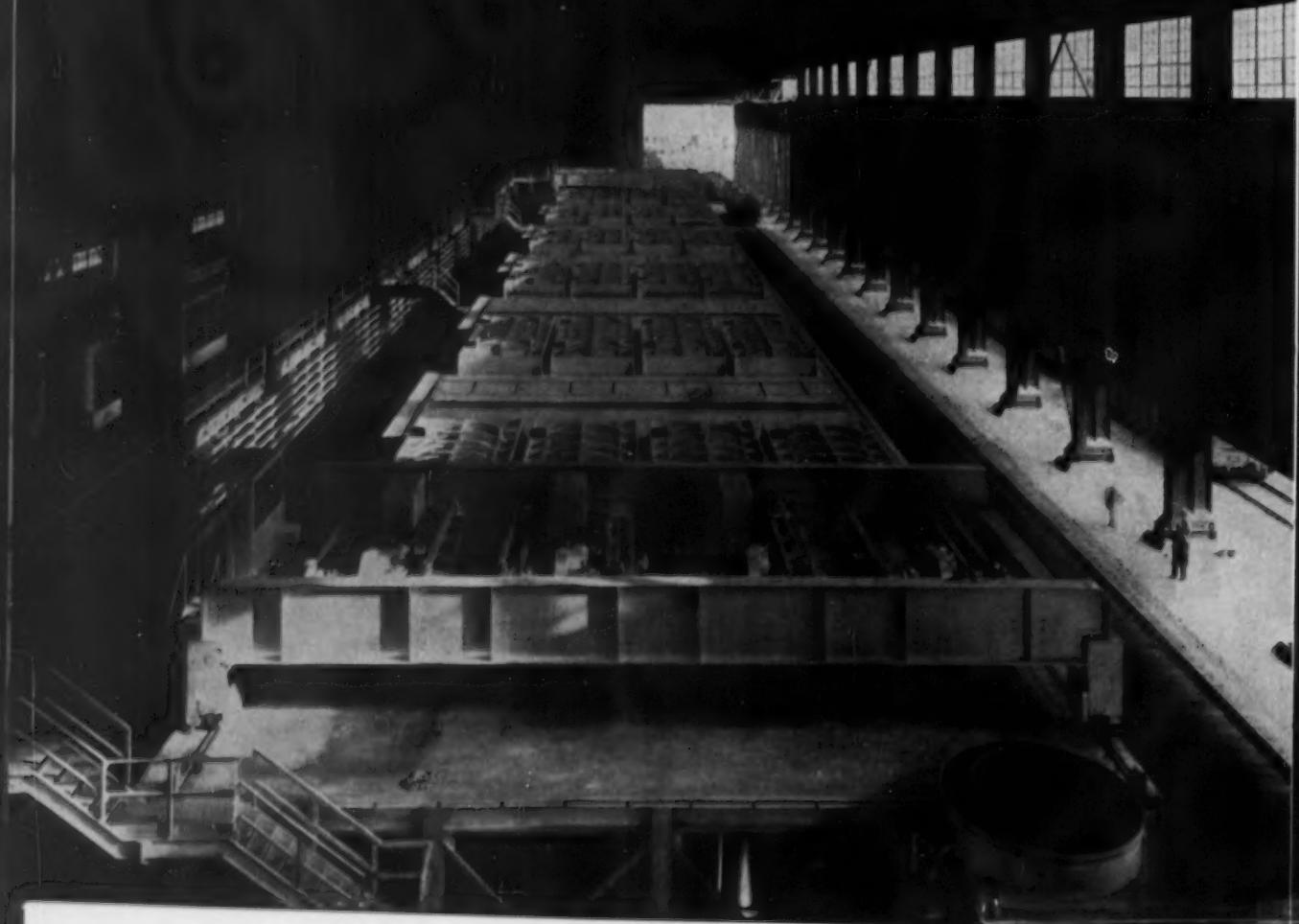
EXS Chain

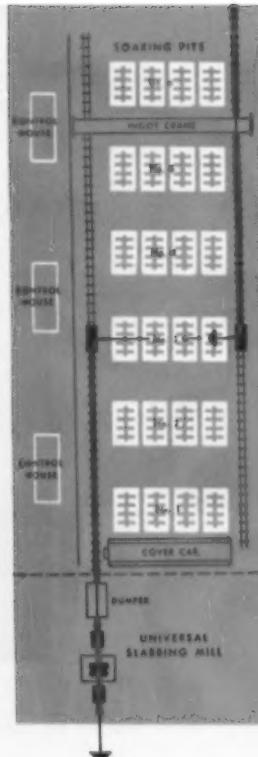
Class C Combination Chain

Class H Drive Chain

Transfer Chain

at Great Lakes, too...





high-production soaking pits

. . . a convincing example of 'Surface' leadership. Behind the story of these 24 soaking pits at Great Lakes Steel, Detroit Division of National Steel Corporation, is an imposing record of achievement: Surface Combustion has built 80% of all new pits since World War II.

At Great Lakes, six batteries, four 'Surface' pits in each, heat low carbon steel ingots for automotive and appliance steel. They also heat some low alloy steel ("NAX" grade). Capacity will be still further increased by the addition of 16 new 'Surface' pits now being built.

These one-way-fired pits include such 'Surface' features as the efficient jet pump recuperative system, and integrated temperature and combustion controls which are of the most modern design.

The performance of these pits, and many others, is among the reasons why steelmakers depend on 'Surface.'

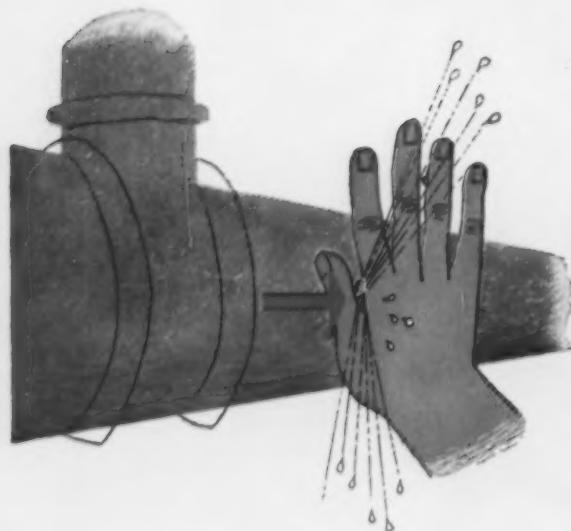
*Repeat order!
Great Lakes just
ordered 4 more
batteries - now 40 pits
in this installation.*

SURFACE COMBUSTION CORPORATION, TOLEDO, OHIO

Foreign affiliate companies:

British Furnaces, Ltd., Chesterfield; Stein & Atkinson, Ltd., London
Stein & Roubaix, Paris, Liege, and Genoa; Chugai Ro Kogyo Kaisha, Ltd., Osaka
Brenno Schilde Maschinenbau, A.G., Bad Hersfeld (Hessen, Germany)





a hole here means trouble...



a hole here saves trouble

Crucible Hollow Tool Steel Bars are a great trouble-saver for the metalworking industry. For they eliminate costly, time-consuming drilling, boring, cutting-off or rough-facing operations. And you save production time, machine capacity, and avoid scrap losses . . . for the hole is already in the steel you buy.

Crucible Hollow Tool Steel Bars are now available in any of our famous tool steel grades . . . in almost any combination of O.D. and I.D. sizes. And you get *immediate* delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air-hardening, and NU DIE V hot-work tool steels.

Let your Crucible representative show you how these easy-to-use Crucible Hollow Tool Steel Bars can save you time and money. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

INDUSTRY REPORTS:

cost-reducing uses for



Refractory Castable Insulation

Here are a few examples of how furnace operators are cutting installation and fuel costs with versatile insulating concretes.

In intricate furnace linings, for instance, B&W Insulating Concrete Mixes do away with time-consuming hand fitting and the many necessary special shapes. These refractory concretes, which can be exposed to flame up to 2200F, have approximately twice the insulating value of regular refractory castables, and are as easy to use.

Other uses include: Holding furnace roof panels, Portable furnace extensions, Annealing furnace bung covers, Patching insulating firebrick linings, Lining ducts and flues, Protection for furnace foundations, Hardening furnace cover linings, Car bottom linings, Cooling pit walls and roofs, Dust collector linings, Door linings, Protection for furnace steelwork.

Briefly, B&W Insulating Concrete Mixes can be put to profitable use wherever the combination of a castable's fast, low cost installation plus insulation is needed. Though somewhat less efficient thermally than B&W Insulating Firebrick, B&W Insulating Concrete Mixes are far superior to regular castables in insulating value. In fact, 7 inches of B&W Insulating Concrete Mix are equivalent, in insulating value, to 24 inches of regular refractory concrete or firebrick.

Get all the facts from your local B&W Refractories Engineer—or write for Bulletin R-22, which gives complete details on B&W's entire line of refractory castables.

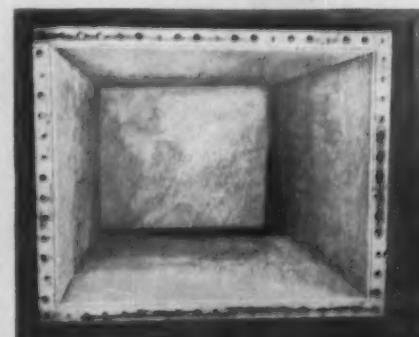
B&W REFRactories PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars
OTHER B&W PRODUCTS: Stationary & Marine Boilers and Component Equipment
Chemical Recovery Units • Seamless & Welded Tubes • Pulverizers • Fuel Burning Equipment
Pressure Vessels • Alloy Castings



Roof and wall panels are made of B&W Insulating Concrete Mix in this stress relieving furnace.



Covers, measuring six and eight feet in diameter, for these 10 draw and hardening furnaces are also lined with B&W Insulating Concrete Mix.

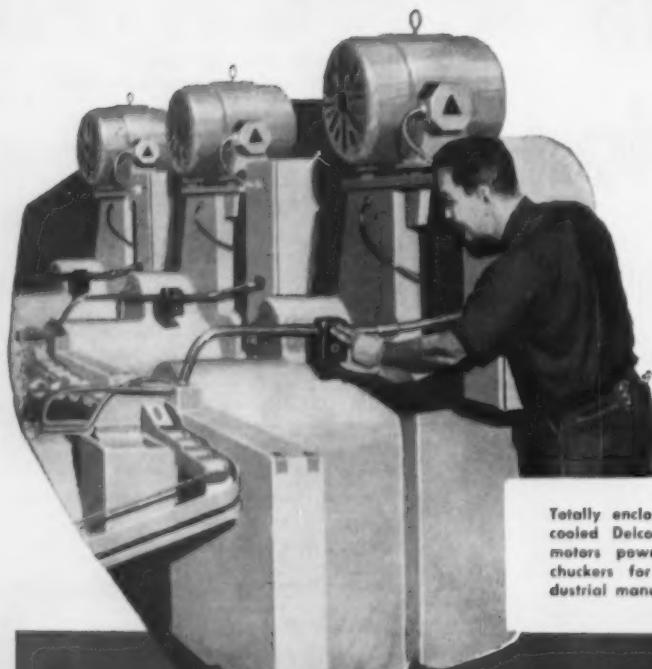


Shown above is a section of a gas turbine exhaust stack lining completely cast with B&W Insulating Concrete Mix.



For top performance,

DELCO



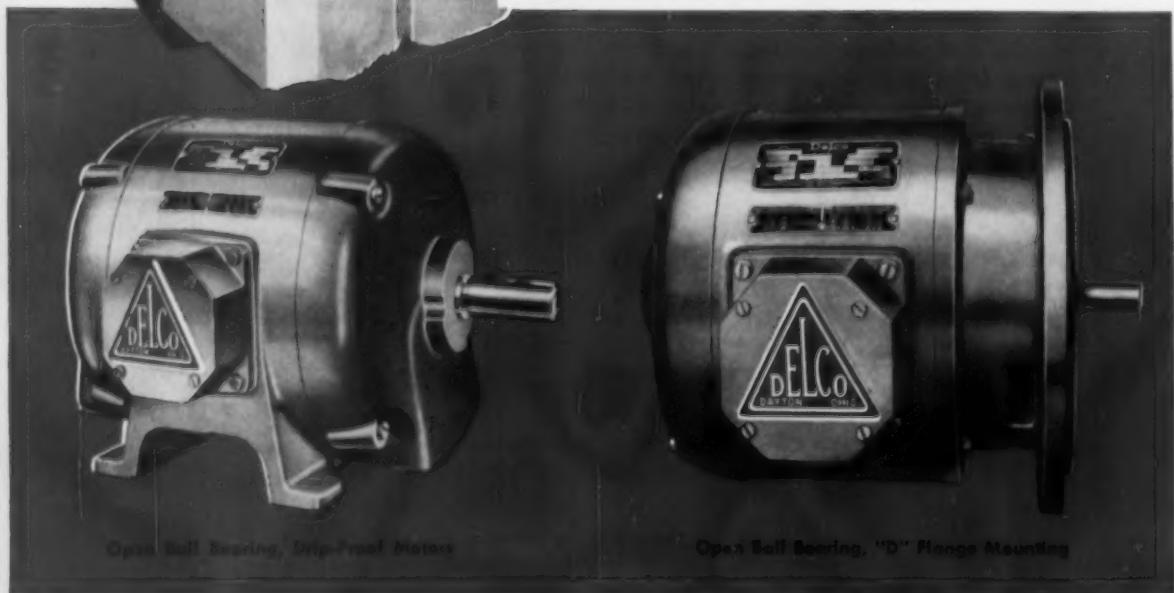
Totally enclosed fan-cooled Delco electric motors power these chucks for an industrial manufacturer.

An electric motor proves itself by performance. And performance proves that Delco electric motors work harder, last longer, cost less to maintain.

Every Delco motor—from fractionals through the largest integrals—is built to exacting standards of workmanship . . . backed by almost half a century



See Delco national advertising in *The Saturday Evening Post* for the story of the full Delco electric motor line.

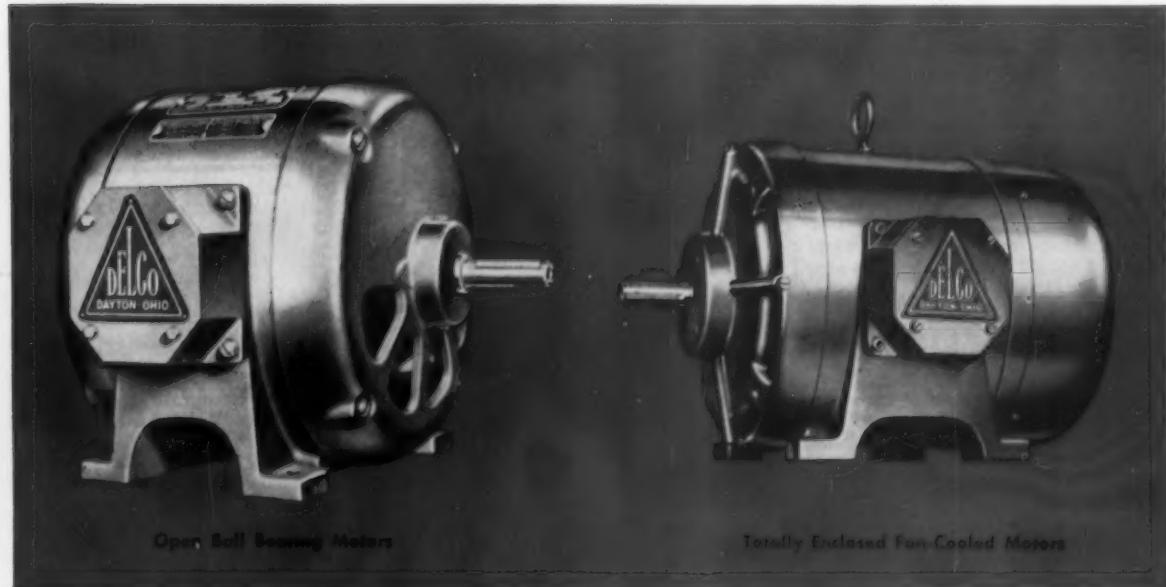


industry has found that it's preferred

of skilled design and engineering experience. Our design engineering service job-fits the proper electric motor to every specific industrial need—helps to specify the right motor for every operation. Delco Products engineers will work with your engineers to give you complete satisfaction. And you can be sure that Delco delivery, too, will be exceptionally good. All the more reason why you should standardize on Delco electric motors.



GM DELCO Electric MOTORS
GENERAL MOTORS
Proved best by Performance!





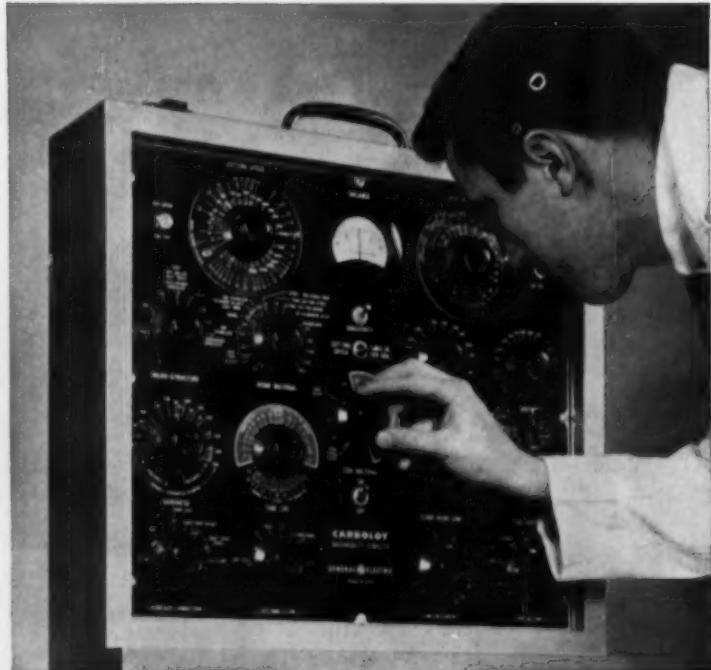
SOLVE MACHINING PROBLEMS IN SECONDS

The Carboloy Machinability Computer can determine the most efficient values for any of these 19 basic operating variables:

Material to be cut: Work material, microstructure, hardness, surface condition.

Cutting tool: Tool material, tool life, flank wear land, tool profile, type of tool, number of teeth.

Cutting conditions: Cutting fluids, feed, depth of cut, cutting speed, motor horsepower, cubic inches per minute, unit horsepower, work diameter, R.P.M.



CARBOLY
DEPARTMENT OF GENERAL ELECTRIC COMPANY



Set dials for the values of each of the known variables. (Time: 1-2 minutes.)



Turn dial of unknown variable until meter balances at zero setting. (Time: 10-15 secs.)



Read the answer directly off the dial. No computations are necessary. (Time: 10 secs.)

WITH CARBOLOY MACHINABILITY COMPUTER

- ▶ Calculate production, tool life, horsepower, or any of 16 other basic machining variables
- ▶ Eliminate wasteful tryout runs, improve existing setups

The Carboloy Machinability Computer is a new engineering tool designed to solve complex machine setup problems in seconds, instead of hours.

It calculates the effect of the 19 most critical machining variables on the material to be cut, the cutting tool, and the cutting conditions . . . shows how to set up optimum operating conditions for any metal-cutting job, and how to improve existing setups by the right variation of operating conditions.

For production men, methods men, etc.

The Computer assists production men by determining rate of metal removal, and by immediately showing how production is affected by changes in feed, speed, depth of cut, tool material, and other key variables.

The Computer eliminates wasteful, nonproductive trial runs, saving valuable stock and setup time. It also determines machine output for methods men, pieces per hour for estimators, and it answers other problems pertaining to machining . . . providing accurate solutions in seconds for problems that normally take hours for even approximate answers.

Easy to use

The Carboloy Machinability Computer is easy to operate. Anyone with machining experience can use it after a short familiarization period.

The computer is portable (weighs only 32 lbs.), battery-operated, and measures 21" x 7" x 20". The price of the computer is \$495, f.o.b. factory, Detroit.

Whether your plant is large or small, the Carboloy Machinability Computer can pay for itself by increasing production, reducing manpower costs. For full details, or to arrange a demonstration at your plant, send coupon today.

CARBOLOY	
Department of General Electric Company	
11153 E. 8 Mile Road, Detroit 32, Michigan	
<input type="checkbox"/> Send me information on the Carboloy Machinability Computer.	
<input type="checkbox"/> Have a representative call to demonstrate the Computer.	
Name _____	
Title _____	
Company _____	
City _____ Zone _____ State _____	
<small>"Carboley" is the trademark for products of the Carboley Department of General Electric Company</small>	

another revolutionary development by La Salle

THE **NEW**
HIGH STRENGTH...

... gives

"FATIGUE-PROOF" steel bars offer high strength in-the-bar . . without the expense and trouble of heat treating. Tensile strength is in the 140,000 to 150,000 p. s. i. range . . hardness which is related to this strength level is approximately 30 Rockwell "C."

"FATIGUE-PROOF" has uniform strength across the bar . . no soft centers. (This uniformity is maintained from bar to bar . . lot to lot.) This remarkable uniformity of strength makes "FATIGUE-PROOF" ideal for applications in the 140,000 to 150,000 p. s. i. range that formerly required heat treated carbon and alloy steels, either hot rolled or cold drawn.

With "FATIGUE-PROOF" you'll get the advantages of heat treating . . none of the disadvantages. In short, you'll get a better part at lower cost.

... yet it's

EASY TO MACHINE

"FATIGUE-PROOF" is a free-machining steel bar . . without question. It machines at least 25% faster than annealed alloys . . 50% to 100% faster than heat treated alloys.

"FATIGUE-PROOF's" excellent machinability permits faster speeds, heavier feeds, better tool life . . your production rates will increase . . you'll get more parts per hour.

Distortion from machining is held to a minimum . . there is no reduction of tool life due to the higher speeds and heavier feeds . . and surface finish is greatly improved.



La Salle STEEL CO.

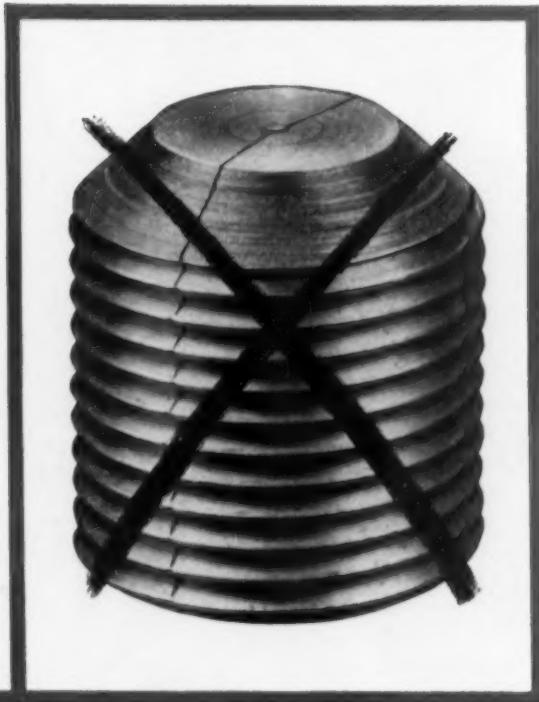
1436 150th Street, Hammond, Indiana

Manufacturers of America's Most Complete Line
of Quality Cold-Finished Steel Bars

fatigue-proof

STEEL BAR

WITHOUT HEAT TREATING



JUST PUBLISHED! Ask for your copy of the new 20-page booklet which gives additional information on the remarkable new "FATIGUE-PROOF."

- *no quench cracks*

- *no distortion from heat treating*

With heat treating eliminated, the problems that accompany heat treating are avoided. Quench cracks become a thing of the past. Distortion and warpage from heat treating don't occur . . consequently time consuming and costly straightening and cleaning operations are not necessary.

You eliminate not only the cost of heat treating but also its disadvantages.

If you have parts where strength is a requirement . . you can save money and get away from problems by using "FATIGUE-PROOF." Our Sales Engineers will be happy to show you how this can be accomplished and provide samples for test purposes.

LA SALLE STEEL CO.

1436 150th Street
Hammond, Indiana

Please send me your "FATIGUE-PROOF" Bulletin.

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Here's where you get the answers to steel problems

● Look under "The Youngstown Sheet and Tube Company" in one of these alphabetical or classified phone books.

They represent the 28 conveniently located district sales offices Youngstown maintains across the country. Offices staffed by men who know the steel business. Men who know and understand your steel problems. Men who are qualified to help you get the specific steel you need.

When you want answers to steel problems in a hurry, just call the Youngstown office nearest to you.



THE YOUNGSTOWN SHEET AND TUBE COMPANY

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT -
MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE
TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

Manufacturers of
Carbon, Alloy and Specialty Steel



IS THIS A FORGING?

Not too long ago, this large component of high quality steel by necessity, would have been a casting, a fabrication or an expensive machining operation.

Now Cameron's Split Die Forging technique produces this piece as an integral forging with internal as well as external contours in sizes from 200 to 5,000 lbs. Machining difficulties are diminished, strength factors are improved and in many cases cost is reduced.

Maybe your product could be improved or more economically produced by using this type of forging.

WRITE

Cameron

IRON WORKS, Inc.

SPECIAL PRODUCTS DEPARTMENT
P. O. Box 1212, Houston, Texas



This company even saved money on Japan!

U.S. Steel Wire Spring Co. thought there must be a better way to bake japan on some small springs than the convection oven they were using. *There was.* Fostoria took a look at the operation and installed a *radiant oven*.

Now, they bake the same quantity of springs

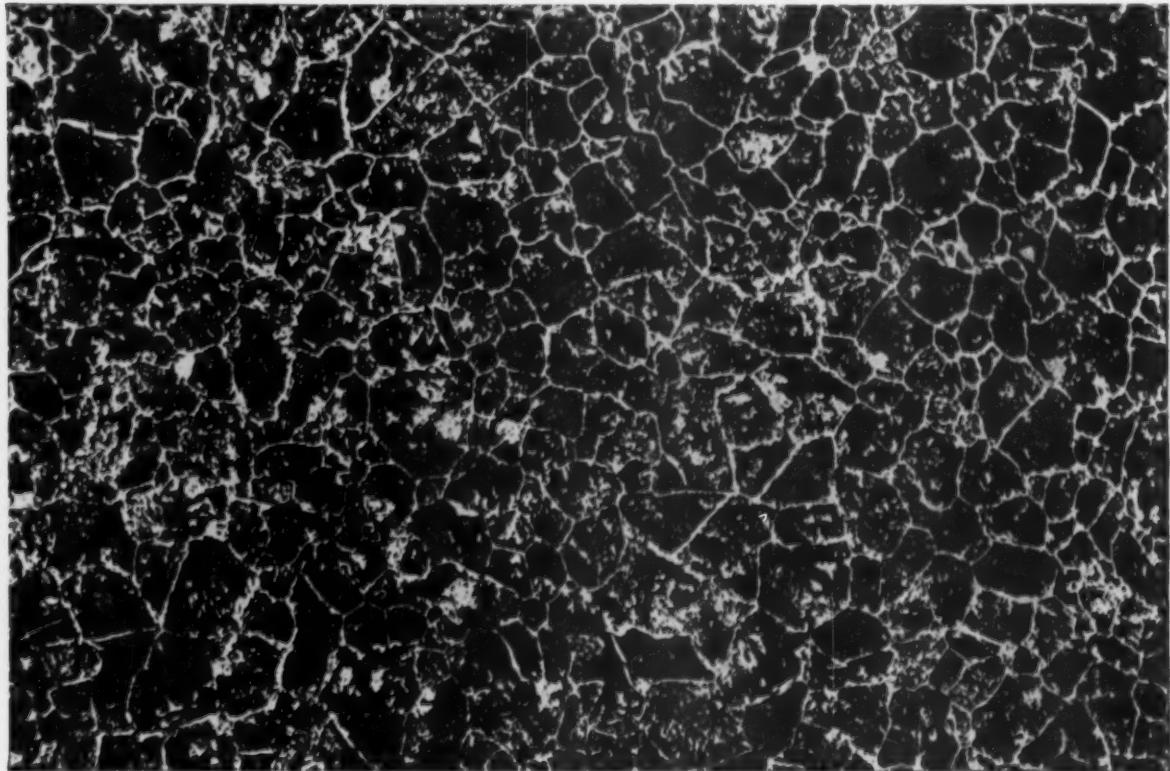
in *ten hours* that used to take *twenty-four*. They use a less expensive grade of japan, but they get a better finish. They saved floor space, time, and enough money to *more* than pay for the Fostoria oven. Let a Fostoria sales engineer look over your drying problem. Just drop us a line.



*Write for FREE booklet
"Applications Unlimited."*



FOSTORIA PRESSED STEEL CORPORATION, Dept. 1124, Fostoria, Ohio



**See for yourself why
TIMKEN® forging steels give you
uniform, high quality forgings**

NOTE the uniform grain size in this photomicrograph of Timken® forging steel. We examine every heat of Timken forging steel—spectrographically to assure uniform grain size. As a result, you can be sure that forgings made from Timken forging steels will give you uniformly high ductility and resistance to impact.

Because your order of Timken forging steel is handled individually in our mill we are able to target our conditioning procedure to your particular forging requirements. That minimizes your rejects.

Every lot of Timken forging steel responds uni-

formly to heat treatment because every lot has the same physical and chemical properties. For example, we rigidly control chemistry with the help of a direct-reading spectrometer which tells us the exact composition in 40 seconds . . . while the steel is still molten.

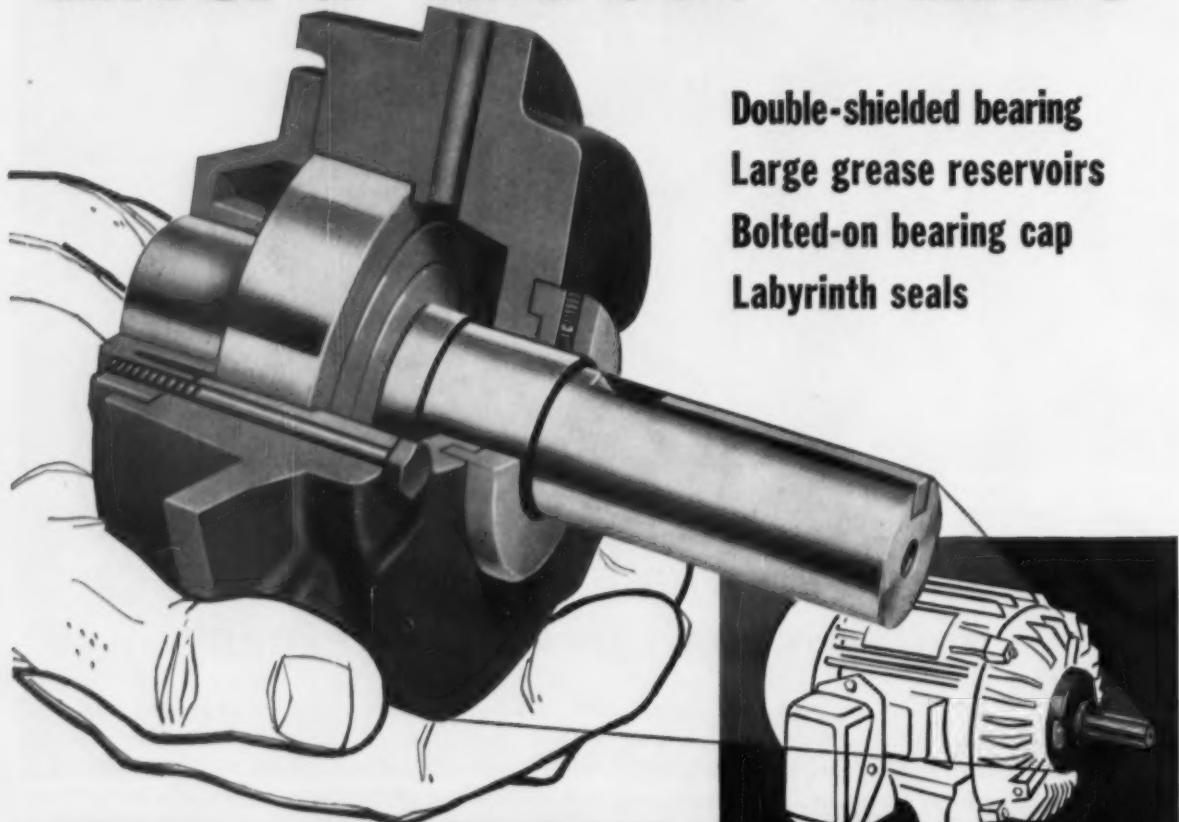
To top it off, Timken steel forging bars save you steel because their good dimensional tolerances produce uniform weight multiples with a minimum of steel lost in flashings. Get all these results in your forgings. Specify Timken forging steels. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

Here Is Extra Motor Value



**Double-shielded bearing
Large grease reservoirs
Bolted-on bearing cap
Labyrinth seals**

**This Allis-Chalmers Bearing
Design Gives More for Your Motor Dollar**

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

You can lubricate these bearings without disman-

tling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and of relieving pressure during re-greasing.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4616

ALLIS-CHALMERS



The Iron Age Newsfront

Allow Liberal Credit on Foreign Machines

German metalworking machinery makers are extending unheard of credit terms in an all-out effort to underbid U. S. manufacturers supplying Mexico and South America. On one recent sale of forming machines, German firms offered no down payment with 10 years to pay. Record high production rates were also claimed for the machines.

Microfilmed Drawings Easy to Find

Microfilming of engineering drawings, plans and specifications promises savings which will establish it as standard industry practice. Look-up time may be cut from as much as \$15 per drawing to as little as 10¢ each. Tabulating and sorting machines can cut this figure further.

Seek Way For Satellite's Return

Few places get hotter than the throat of a jet engine, but the first artificial satellite to be launched by the U. S. could get much hotter when it falls back into the earth's atmosphere. There's some question as to whether the Mouse, the first satellite, can be saved. Later satellites can be protected from frictional heat with a beryllium oxide shield. At present, titanium is the leading contender for the skin of the sphere.

Things Are Getting Tougher

Phosphate coating films for wire stock used in fastener forming have shown remarkable toughness during drawing. The coatings are dependable for remaining in place and providing a base for strong bonding of subsequent coatings. Phosphate coatings will hold on through eight to nine hole drawings, and in some cases have gone through thirteen drawings intact.

Mill Welds Pipe At High Speeds

Cold-formed welded pipe, made from plate up to $\frac{1}{2}$ in. thick and 20 in. diam will be turned out soon at speeds of 35 to 40 fpm. A Midwestern firm has shipped a new automatic welding ma-

chine to Germany for this purpose. On pipe of $\frac{6}{7}$ -in. diam and $\frac{3}{16}$ -in. wall thickness, output speed will be about 100 fpm. A similar machine being built for use in the U. S. will have removable and interchangeable roll stands to reduce downtime to a minimum.

New Casting Machine Cuts Part Costs

A simplified casting machine, using low-cost precision cast molds, is reported to have brought the cost of permanent mold aluminum castings within the competitive range of die-castings for many applications. The process is being used for both long and short runs, and for castings weighing up to 70 lb.

Look At '57 Hazy On Radar

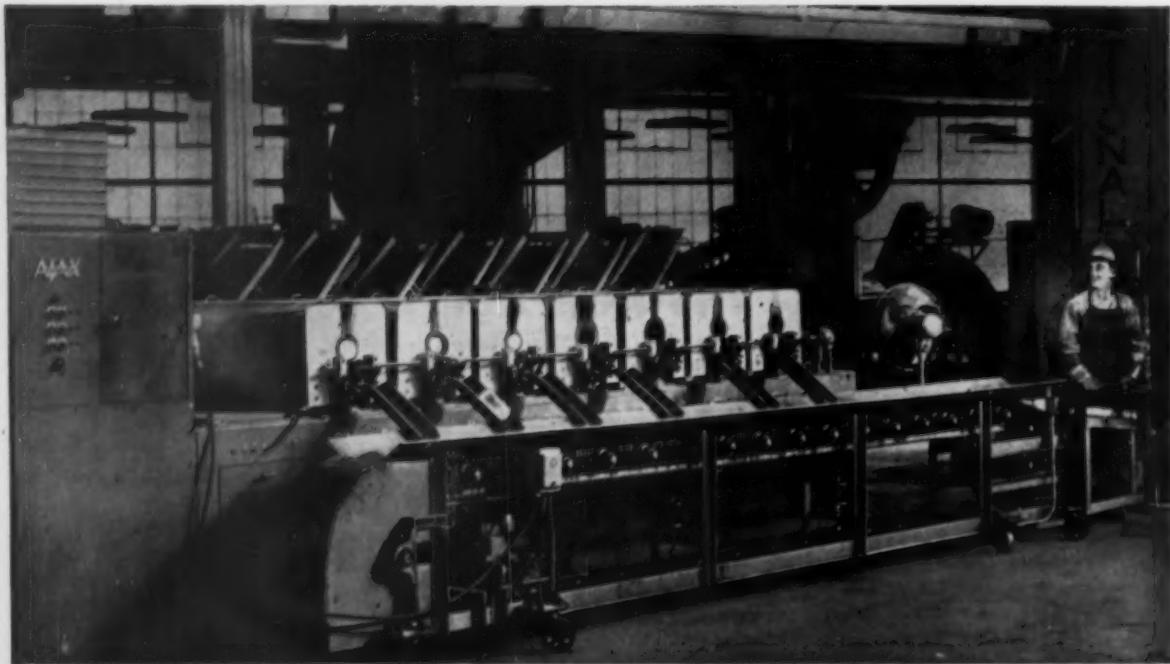
Latest well-founded rumor in Detroit is that one of the independent automakers purchased patent rights to a radar braking system. As to whether the system will be used on 1957 cars depends on the company's ability to overcome some technical problems.

Big Three To Get Bigger

The "Big Three" auto producers have been spending billions on capital improvements since 1946 and are planning still larger cash layouts for expansion. The latest dope has it that General Motors will announce next January that it is ready to expend additional sums to further increase its production.

Home Wiring Drive May Expand Market

A recent check of more than 60 large power companies shows that they'll spend over \$4 million to promote the need for adequate house wiring. Objective is to reach a residential market involving about 34 million older homes. At an estimated cost of \$100 per home, wire manufacturers, utilities and contractors figure a potential wiring market worth about \$8.5 billion.



want to mechanize forging?

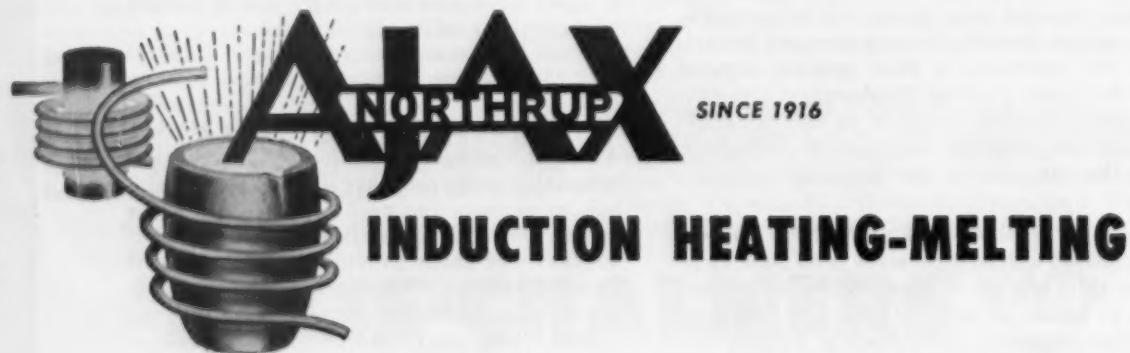
This large forge shop could show you how. Turning out auto and tractor gears along with hundreds of other parts large and small, it relies upon Ajax induction heating for faster, more efficient production . . . lower material cost . . . greatly reduced manpower . . . and an impressively low reject average.

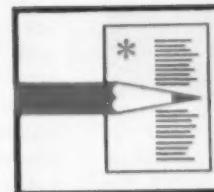
A complete battery of over a hundred Ajax-Northrup heaters can be put into service here for heating bars of various lengths and weights and in sizes from one inch rounds to four inch squares, each scheduled for automatic or even patterned

heating at just the desired rate for the forging operation. Rapid induction heating makes scale formation almost nonexistent; forging dies last much longer.

Here is mechanization brought to the difficult forging process—thanks to the speed, precision, and reproducibility of Ajax-Northrup heating. An Ajax representative will be glad to show you how it can help mechanize your production. Or, just write Ajax Electrothermic Corporation, Trenton 5, New Jersey, for Bulletin 27-B.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.





NEWS
SECTION
SPECIAL
REPORT

Can You Tap Aircraft's Big Backlog?

Mature aircraft industry searches for suppliers . . . \$8 billion sales, \$14 billion backlog mean big business . . . Report tells how to reach this market, what's wanted . . . Commercial race brings orders—By R. R. Kay.

♦ SALES \$8 BILLION a year . . . backlog over \$14 billion . . . work guaranteed through 1960.

Sounds fabulous? That's an up-to-the-minute picture of the robust aircraft industry.

What does all this mean to metalworking and metal producing?

If you're a supplier or subcontractor, you'll be busy right through 1960 and beyond.

If you're not, and want to be, you'll find good tips in this report on how to tap the market.

Business will be good—very good. Best estimates are that current aircraft and missiles defense spending of \$7.5 billion to \$8 billion per year will zoom to an annual \$12.5 billion to \$14 billion in the 1960 decade. This virtually guarantees that the aircraft industry's suppliers and subcontractors will be working at high speed for years to come.

Permanent Defense

Long-range Pentagon planning is to maintain a powerful, modern air force and to stabilize production levels. Defense spending is no longer on a here-today-gone-tomorrow basis. And the average taxpayer now considers it as necessary as insurance premiums and rent. So the painful peaks and valleys that plagued the aircraft industry are gone.

Backlog is now \$14 billion—plus big orders for guided missiles and ground-based avionic equipment.

The industry's biggest customer continues to be the military. This year it will buy 8500 of the 12,000 planes made. You can expect a moderate decrease in the number

of units produced next year; more emphasis on heavy bombers and transports; less on light trainers and fighters. But total production by weight—150 million airframe pounds—will be about the same as this year.

More Commercial

A \$1.25 billion commercial backlog—up a giant 400 pct since early 1955—is the biggest in history. Watch it climb another half billion.

Trend is away from total dependence on military business. In some companies, commercial orders are now a good 29 pct of their business—up from a recent 9 pct. (See THE IRON AGE, West Coast Report, Sept. 1 and Oct. 27, 1955.)

Today, 91 different models, ex-

clusive of pilotless aircraft, are rolling off the assembly lines. Twenty-eight companies make 65 military models—from light liaisons to supersonic bombers. They're also building 26 models of commercial aircraft for the world market.

Planemakers hold 40 pct of prime contracts for guided missiles; components builders, 25 pct; engine manufacturers, 12 pct.

Industry Stable

Now that the aircraft industry is well-stabilized in our economy—third in sales—metalworking and metal producing firms can bank on a steady flow of orders. Also, today's jet is so complex that no one company can make the whole plane.



TYPICAL of the increased activity in vast coast aircraft plants is the assembly line for Lockheed Super Constellations. Special multi-unit assembly docks are used in an effort to turn out more planes.

SPECIAL REPORT

Last year the major planemakers picked up a \$4.7 billion bill from 50,000 suppliers and subcontractors. Small firms (under 500 employees) got over \$2 billion of it. Large companies (over 500 employees) collected \$2.7 billion. Every state in the country shared.

An East Coast engine manufacturer shells out 50 cents of every dollar to his 2922 subcontractors and suppliers in 32 states.

A West Coast fighter builder spends 55 cents of each dollar with small companies spread over the 48 states. He buys from some 10,000 firms which, in turn, buy their supplies from 60,000 other firms.

These are not exceptions to the mutual dependence of big and small business—in fact, they're the rule. Cities and towns all over

the country credit their growth and economic well-being to the aircraft industry.

Small firms can often make parts and components faster, better, and cheaper than the prime contractor. Planemakers are alert for new subcontractors. And they have teams of specialists out searching, ready to help qualified firms set up.

Guide to Business

If you're interested, here's what they'll want to know:

1. **TYPE OF WORK:** What can you handle? Any aircraft experience?

2. **PLANT:** Square footage. Bays. Floor strength. Etc.

3. **FACILITIES:** Makes, sizes, model numbers, capacities of your power machinery—include any on order. How are you set up for processing, treating, plating, welding, inspection, research?

4. **PERSONNEL:** Who's who in your company? Number and types of skilled and unskilled workers.

Labor resources.

5. **FINANCIAL:** Bank and credit references.

6. **MISCELLANEOUS:** Data on plant security, transportation facilities, freight handling, expansion possibilities.

Complex Parts

Jet planes are mighty complex to build . . . 184,000 parts in a giant bomber . . . 18,000 types and kinds of materials . . . 14,698 bolts and rivets in a swept-back fighter wing . . . 569 forgings and castings in a fighter—some small as a king-size pack of cigarettes, some like a 10-ft overgrown hockey stick . . . 5 million manhours to build production tools and special parts.

Today's jet bomber uses: 65,000 tools; over 1000 gears; 400 electric motors, generators, and other rotating electrical machines.

And it takes 20,000 special tools to build a modern axial-flow jet engine. Some 8854 parts for it come from 4000 subcontractors.

Aircraft industry eats up a lot of metal—gobbled 20 pct of aluminum used in the metalworking industry last year. To make one pound of airframe takes an average of: 2.2 lb aluminum, 1.8 lb steel alloys, and 4.3 lb carbon steel. These are Aircraft Industries Association figures.

ALUMINUM Pct

SHEETS	46
EXTRUPTION	17
PLATE	5
BAR	25
FORGING	14
TOBE	13
WIRE	14
TOTAL	75

STEEL Pct

BAR	7
SHEET	9
FORGING	16
TUBE	17
MISC	3
TOTAL	21

OTHERS Pct

COPPER	0.9
MAGNESIUM	0.5
LEAD	0.6
TOTAL	4

METALWORKING IN A JET AIRFRAME



An important sidelight in the aircraft picture is the terrific struggle for leadership in the commercial airline field among Boeing, Douglas and Lockheed.

Commercial Competition

This battle is the result of competition among U. S. airlines, each wanting to boast the ultimate in passenger comfort and the shortest flying time.

This is behind the \$1.25 billion backlog of commercial plane orders, including recent purchases of turbojets and turboprop airliners, some of the largest contracts in the history of commercial flying.

American Airlines recently ordered thirty turbojet airliners from Boeing—707 Stratoliners that will cruise at 550 mph and will cost a total of \$135 million.

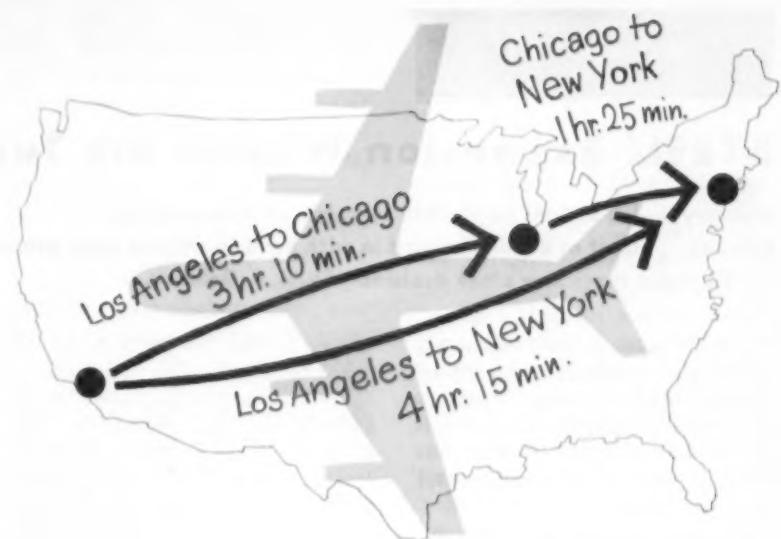
Pan American recently engineered a \$269 million order for a total of 45 planes from Boeing and Douglas, 30 of them Douglas DC-8 jetliners. National Airlines earlier placed an order for six DC-8's and United has 30 Douglas jet airliners on order. Eastern recently announced an expansion program involving 100 airliners, including 20 jets from either Douglas or Boeing.

American already has on order a fleet of 45 Lockheed turboprop planes, 400 mph Electras, which experts say have some advantage over turbojets for shorter hauls. Eastern has 40 turboprop liners on order. Capital was the first to enter the jet field with turboprop Viscounts ordered from the British.

Fast Schedules

The jet age for commercial flying is still a year or two ahead. American expects to have daily jet transcontinental service by June 15, 1959. Pan American expects to receive some of its DC-8's by late 1958.

American will operate on a schedule flying from Los Angeles to New York in 4 hours 15 minutes; Los Angeles to Chicago, 3 hours and 10 minutes; Chicago to New York, 1 hour 25 minutes. Westbound flights will take somewhat longer because of prevailing westerly winds.



Jet Airline Schedules—1959

IN A FEW years flight times like these for passenger planes will be merely average. One cause of the

tremendous strides being made is the competition among aircraft builders for industry leadership.

But all is not a bed of roses. Some big problems stare the industry in the face.

Need Tools

On order for 1956-57 delivery are military planes flying at 800 mph to 1000 mph—today's jets are in the 700 mph class. Switching production to the hotter models will need something like \$500 million worth of new machine tools.

Another headache: serious shortage of engineers, highly-skilled production workers, and managerial personnel. Industry now has 800,000 workers—second only to automobile manufacture.

Major problem facing the 50,000 suppliers and subcontractors is the new and difficult production methods needed to turn out modern high-performance planes. Faster planes must have thicker metal sheets, harder materials, closer tolerances.

Many parts that were formerly bent into shape are now machined. Plane-building today calls for more complicated structures and joints.

Large and complicated machinery—the kind that can't be built or put up overnight—is common-

place. On the increase are special-purpose machine tools, all huge: milling machines, stretch-formers, hydraulic presses. Also needed: more standard machine tools.

But if you're after aircraft business, don't let these problems throw you. You've got a good chance to share in new production orders. They'll go to competent, efficient, low-cost manufacturers—large and small.



AIRBORNE without wings, fuselage is carried to wing assembly area rapidly by overhead crane.

STEEL: Expansion Wheels are Turning

Industry laying billions on the line to catch up with growing demand . . . Cost of expanding tied in with need for higher steel prices . . . National faces new plant decision—By J. B. Delaney.

♦ A NEW wave of steel expansion is getting underway. Spurred by unprecedented demand from a growing economy, the steel industry is earmarking billions of dollars for new ingot capacity and other facilities.

A survey by THE IRON AGE reveals that roughly 40 pct of the industry has indicated that it will bring in approximately 6.3 million ingot tons of new capacity by 1959. A projection for the entire industry would indicate an increase of close to 16 million tons. Present capacity is 125.8 million tons.

Significantly, much of the new capacity will come from enlargement of existing facilities and im-

proved production methods as opposed to new melting furnaces.

Companies that responded to the survey or had previously announced expansion plans expect to spend about \$1.250 billion. If other firms spend in proportion, the total tab would come to more than \$3 billion.

Four Million Rate

In the nine postwar years through 1954, the industry expanded at an average annual rate of 3.7 million tons. The latest expansion wave would average about 4 million tons a year.

The projection is in line with estimates of some steel leaders that the industry must expand by

4 million tons annually to keep pace with growing demand.

Higher Prices

Chances are that, if anything, the projected 1959 capacity figure will turn out to be conservative.

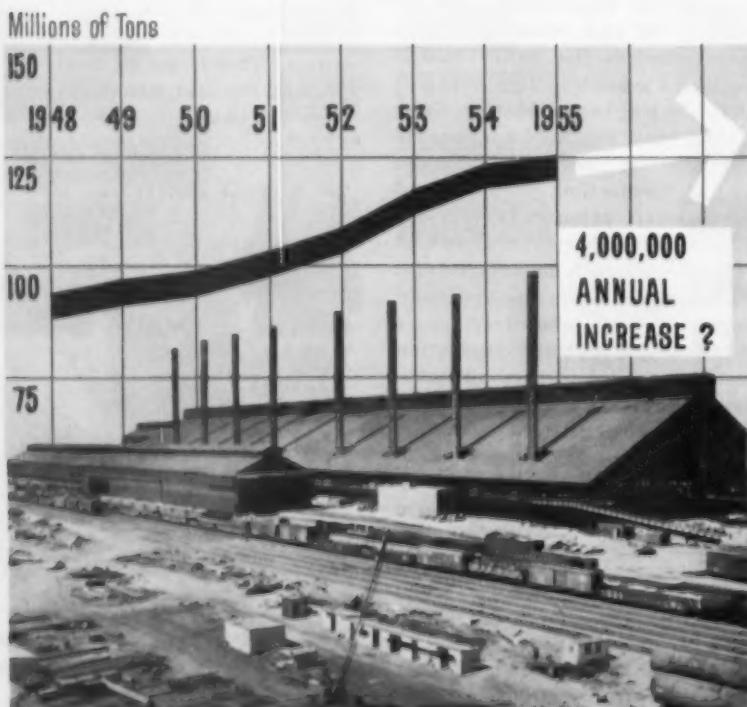
Where is the money coming from? Largely from higher steel prices, retained earnings, and new equity capital.

Industry leaders are not fooling when they talk of the need for higher prices. They're not as gunshy as they used to be on prices. They're more sensitive today to criticism for failure to expand. The present tight steel market with its accompanying deterioration of customer relationships is the last straw.

The Government's refusal to extend further fast-tax relief for steel expansion is still another factor in the industry's case for higher prices. Steel leaders have been complaining for years about "horse-and-buggy" depreciation allowances based on original rather than replacement cost of equipment. Rapid amortization gave them some relief, but they're now back where they started. This means that a bigger share of expansion costs must come out of earnings.

As a result, the chances are better than even that some steel prices will rise industry-wide after the turn of the year. They'll go up again after next summer's steel labor settlement. Some smaller firms already have kicked up prices of selected products due to the pressure of rising material costs. Others have reinstated extra charges that were dropped during the 1954 recession. Still others have been quietly increasing or adjusting extras.

Steel's Climbing Capacity



Need Profits

Tied in with the need for more equity capital is the necessity of a continuing good showing profit-wise. Steel prices are important in this connection, too. The industry has done a good job of courting the investor in recent years. It recognizes the importance of doing even better. National Steel, for example, recently boosted its annual stock dividend base \$1 per share to \$4.

The industry's chances of raising new equity capital are good. Wall Street no longer looks at steel stocks with jaundiced eye. Investors are smitten with the industry's earnings record and business outlook. Value of steel stocks has been increasing. Dividends are steadily improving.

Biggest announced expansion program is that of Republic Steel Corp., which plans to add 1.6 million tons of capacity by 1958. Armco is second with plans to install 1.2 million tons by 1957. Inland Steel, which added 200,000 tons this year, will install another 800,000 tons during the next two years.

It looks like National Steel Corp. is expanding right out of its britches. It will spend \$200 million installing 1 million ingot tons at Weirton and Great Lakes over the next four years. Most of the new capacity will come from improvement and enlargement of existing facilities.

But when this is done, just about all the available expansion space at existing plants will have been exhausted. National then will face the big decision of whether to build a brand new plant at one of two tracts it has held for some years. One tract is near Camden, N. J.; the other in the Chicago area.

Where It's Going

The industry's top producers, U. S. Steel Corp. and Bethlehem Steel Co., have said little on expansion plans, officially. But chances are good that both will do as much or more proportionately than the balance of the industry.

U. S. Steel has plenty of room for expansion at Fairless, which

was laid out with expansion in mind. There have been reports, too, that the company will replace at least part of the 1 million tons of outmoded capacity torn out at Pittsburgh in the last several years.

Merger in Doubt

Bethlehem is expansion-minded. Eugene Grace, chairman, said recently that uncertainty over whether a quick court ruling could be obtained on the proposed merger with Youngstown Sheet & Tube is interfering with expansion plans. But Attorney General Brownell claims the Government is ready to expedite a court decision on the matter. At any rate, Bethlehem is not likely to lag behind other producers for long.

On the basis of the survey figures, the industry will spend about \$200 for each ton of new capacity. Some will get off the hook for less. This includes more blast furnace capacity and cost of expansion and improvement of finishing mills, ore processing, soaking pits and other facilities as well as new steelmaking furnaces and enlargement of existing furnaces.

National will get its million-ton increase with only one new open-

EXPANSION

hearth at Weirton and possibly several at Great Lakes. Balance will come from improvement and enlargement of present facilities. The 200,000 tons Inland brings in this year will result from installation of additional materials handling equipment in one of its open-hearth shops; the 800,000 tons coming up will result partly from three new 315-ton openhearts, partly from improvements in existing furnaces and production techniques.

Cheaper to Improve

The story is the same for other companies contemplating expansion. Producers have learned that it's cheaper and easier to get more capacity enlarging furnaces and improving production techniques than it is to build new furnaces.

Most of the planned expansion will not go into operation in time to alleviate the immediate shortage problem. But in the long run, steel is making major strides to assure adequate supplies for the future.

New Steel Expansion

Company	Investment (millions)	Capacity Increase (Net Tons)	Completion	Present Capacity
Republic Steel Corp.	\$130	1,818,000	1958	10,262,000
Jones & Laughlin	250	700,000	1958	8,100,000
National Steel	200	1,000,000	1959	8,000,000
Youngstown Sheet & Tube	120	Not Specified	1956	5,520,000
Inland	260	Specified** 800,000 200,000*	1958	5,000,000
Armco	130	1,176,000	1957	3,100,000
Wheeling Steel Corp.	65	Not Specified	Indefinite	2,130,000
Pittsburgh Steel Co.	14	180,000	1956	1,404,000
Detroit Steel Co.	10	160,000	1956	1,290,000
McLouth Steel Corp.	21.5	140,000***	1956	1,200,000
Granite City	—	300,000	1958	1,080,000
Allegheny Ludlum	10	—	—	863,500
Northwestern Steel & Wire	1.5	—	1956	825,000
Copperweld	12	42,000	1957	818,000
Keystone Steel & Wire	10	Not Specified	1957-58	425,000
Continental	1.7	26,000	1956	394,000
Carpenter	9	17,500	1960	386,000

* Completed in '55.

** 230,000 tons in '55.

*** Completed in '54.

INTERNATIONAL

ARMAMENTS: Eat Up Red Steel

Nearly 25 pct of Communist steel production goes into armaments . . . Reds build up Far East military potential . . . West Germany leads Free Europe's steel output.

◆ RUSSIA AND RED satellite countries are putting nearly 25 pct of their steel output into armaments. This compares to less than 3 pct for non-Communist West Europe.

A roundup of the European Steel picture also reveals that West Germany will overtake Great Britain as western Europe's biggest steel producer this year.

The Communists are expanding their Far East military potential. They are building up a vast rail network across China and Siberian wastelands. They're earmarking nearly 30 pct of total steel production to shipyards, airfields, and aircraft. About 12 pct of non-Red output is going into similar projects.

The Far East rail network includes expansion and improve-

ment of links between Sinkiang and Canton. New equipment is being shipped in sizable quantities for a main line hooking up the Bering Straits with the Trans-siberian railroad.

Big Soviet steel customers include Mongolia and North Korea as well as China. Recent satellite markets include the Near East and Argentina. Egypt, for example, is receiving seven steel road bridges from Hungary, and sizable amounts of railroad equipment are reaching Burma from Poland.

Leads Exporters

Outside the Red orbit, the leading European steel exporter in relation to total steel output is Austria. So far, the newly independent nation is not producing armaments.

Belgium and Luxemburg, both European Coal & Steel Community members, are also heavy steel exporters. Roughly two-thirds of their steel production goes to foreign markets.

German Comeback

The United Nations Economic Commission for Europe says the West Germans turned out about 1 million more tons of steel in the third quarter than the British. At the start of the year, British and West German production was equal.

ECE figures for non-Communist Europe show that steel output through the first three quarters of 1955 continued to break all records. West German production was up 18 pct over 1954. British output climbed 8 pct, Italy 30 pct, Belgium 15 pct, France 11 pct, the Netherlands 5 pct.

Trade:**Step-up in East-West flow looks dim.**

Prospects of increased trade in nonstrategic goods between this country and Iron Curtain countries remain slight, despite plans of the U. S. Commerce Department to increase the list of goods which may be sent to Russia and her satellites.

U. S. exports to the Soviet bloc have shown some increase this year. In the second quarter, exports totaled \$2 million, compared to \$1.4 million in the first quarter. This is a 40 pct increase, but still far below the \$120 million recorded in 1947.

U. S. imports from the Iron Curtain dipped to \$10.9 million in the second quarter of this year, compared with \$12.7 million in the first quarter. In the second quarter of 1954, U. S. imports from the Red countries amounted to \$10.8 million, but shipments to the Reds totaled only \$463,000.

Commerce Department officials are compiling a new and larger list of nonstrategic goods which may be shipped to Iron Curtain countries without a special export license, hoping this will increase trade in the months ahead.



NO MEDIEVAL MONSTER, this \$5 million German dredger is reportedly the largest of its kind in the world. Working a lignite pit near Cologne, the 5500 ton machine is 656 ft long, has a 52 ft dia steel wheel "mouth." Its 12 jaw-like scoops are powered by one of 116 motors on the dredger.

LABOR

INCENTIVES: Aid to Indirect Workers

Plan giving incentives to workers not engaged in actual production pays off... Neglected indirect workers boost output, cut costs under system... It is elastic within limits—By K. W. Bennett.

♦ TOO OFTEN forgotten in the growing scramble for paychecks fattened by incentive pay, the indirect worker may have his inning. M. J. Geerling, American Seating Co., Grand Rapids, Mich., reports an incentive pay plan that is boosting paychecks for lift truck operators, plant housekeepers, crane operators by 30 pct; yet is reducing manufacturing costs.

American Seating Co. represents a good cross section of metalworking manufacturers including foundry operations, steel stamping, welding and fabrication, metal finishing, metal trimming, crating, wood machining and cabinet making, wood finishing, work in plastics, aluminum machining and assembly operations.

What's an indirect worker? Mr. Geerling, concentrating on the stamping job as an example, lists shear operators and press operators as the direct workers. The indirect workers: die setters, crane operators, lift and tow truck operators, plant housekeepers. Indirect labor incentives now cover 285 employees of the total American Seating workforce.

Boosts Efficiency

Time studies on indirect jobs convinced American Seating that indirect workers not on an incentive plan are operating at about 65 pct efficiency. The incentive plan correlates direct and indirect labor output within each plant department, limits indirect labor to the net incentive paid to direct workers but has had the effect of boosting indirect labor output to the high efficiency levels of workers on the production line.

The method: determine by time study exactly how much work

each indirect worker performs within a given period in the plant department in which he's employed. Record total output of the department during the same period and relate these two figures as a second step.

The resulting percentage (indirect labor hours as a percentage of direct labor hours) can be used to figure the number of indirect hours that would be standard for any number of hours worked in a week by the direct labor group. If the indirect labor group does its job in less time in any given week than the standard requirement, incentive pay is given indirect workers for the number of hours they've reduced their work time below the standard.

Elastic Scale

The work standard is elastic, subject to constant study by the department supervisor and a full time time study engineer, and payments are based on average

hours worked as opposed to average standard time allowed (which would change weekly with department output) over a 10 week period. It's a moving average; as the average for a new tenth week is calculated, the first week is dropped.

It works. American Seating's 285 indirect labor employees are averaging 34 pct more pay than they would be getting if they were working at standard output. Turnover has fallen, labor relations sound good, and manufacturing costs are down.

The American Seating Co. program is considerably more complex than the outline here. But it's a concrete attack on a problem that's not been given the attention it deserves. More important, the inventors are well satisfied with their product. Mr. Geerling spoke at the National Time & Motion Study Clinic of the Industrial Management Society meeting at Chicago.

Why Unions Are Tough Bargainers

♦ ABOUT ONE-THIRD of all nonfarm wage and salaried workers, or an estimated 18 million persons, are now members of national and international unions, the U. S. Labor Department estimates.

In its latest "Directory of National and International Unions in the United States," the Department reports:

Thirteen unions account for almost half the total membership; six unions have combined membership of about six million; there are 195 unions bargaining in two

or more states, and 75,000 locals with 125,000 collective bargaining agreements; nineteen unions have more than a thousand locals each; there are some three million women union members, and union rolls have been growing at about the same rate as the nonfarm labor force.

The publication lists each national or international union and federation, address, affiliation, principal officers, membership, and number of locals. It is available from the Superintendent of Documents, Washington 25, D. C.

FOUNDERS: Riding on Rail Car Boom

Steel founders are having one of their best years, can look to good business into 1956 . . . Rail car building program is big factor in improved shipments . . . Scrap prices cut profits—By T. M. Rohan.

♦ STEEL FOUNDERS are wrapping up one of their best peacetime years and have just as good a one in prospect for 1956. Bookings in the first nine months of this year are double the bookings for the same period last year.

October bookings were 72.8 pct of maximum commercial demand and November production is estimated at about 73.7 pct of maximum commercial demand. The maximum figure is theoretical and a rate between 70 to 80 pct is considered "very healthy."

Backlogs average about four months nationally and are out to six months in some cases. Regionally, the South is leading the parade with the Midwest and Far West close behind. Pickup in the East has been slower but has fewer wide fluctuations.

Railroads Big Factor

Big push has come from railroad car building program which represents a major factor in the market for steel castings. These are principally in rail car couplings, side frames, bolsters and draft gears.

Major problem in the industry is the rise in scrap prices which foundrymen generally attribute to heavy exports. Exports this year will approximate 4.5 million tons while total steel foundry consumption in 1951, one of its best, was only 4 million tons.

Compete With Fabricators

But steel foundrymen expect that despite the higher cost of raw materials, they will not be at a disadvantage in their running skirmish with the steel fabricators. They feel the increased cost of finished steel products plus labor cost increases will make it a standoff.

And foundrymen are also renewing their efforts to improve production methods and quality of product. At the Steel Founders Society's annual technical conference, items of major interest were reports and discussions on shell molding, cleaning, finishing, inspection and use of pneumatic diaphragm molding machines introduced about two years ago. There has also been a "fair amount of acceptance" of the minimum standards for the industry proposed by the Society last year (IRON AGE, Sept. 23, '54, P. 75).

With a booming market in steel mill production and a shortage of basic steel, some steel foundries with openhearth furnaces are being approached to produce conversion ingots. Although costly, this method is widely used during periods of extreme shortage. Most furnaces of this type are located in the Delaware Valley, Pittsburgh, central Pennsylvania, Chicago and St. Louis. A few steel companies also have captive foundries with openhearth furnaces.

Full Production

Some of the impact of railroad carbuilding orders on top of regular industrial orders can be gauged from National Malleable and Steel Castings Co. in Cleveland. This firm has assurances of full production through the first half of next year and orders for the second half are in the talking stage. Automotive backlog is also heavy with schedules from 30 to 90 days being placed and releases ordered against them as needed.

Inventories Adequate

Prices on railroad equipment furnished by steel foundries went

up six to seven pct in August following steel price increase and new wage settlements following the steel pattern. Increased labor costs are also expected to boost the price of malleable iron in the near future.

Sales of merchant iron to steel foundries are in a healthy and balanced condition. Foundries are placing orders on regular 30 day basis and merchant iron furnaces are at capacity operation. Most foundries have 30 to 60 day inventories now and with 30 day deliveries, see no cause for alarm in the immediate future.

Seek Higher Tariff

Leading Canadian steel producers are seeking higher tariff charges on steel imported into Canada for use in secondary manufacturing. Representatives of the five leading steel mills told the Tariff Board in Ottawa that the secondary industries received adequate protection on their own products. At the same time, through special concessions, many of them were permitted a 99 pct refund on customs duties paid on such steel as formed part of their raw material.

A request by the mills for the withdrawal of this refund or drawback privilege featured a basic conflict of interest between the mills and the fabricating industries. The latter see their costs being greatly increased — to the point of forcing them out of business, some of them say—if they have to pay full duties on their steel imports.

Automobile manufacturers, the construction industry and an array of lesser manufacturers, gave notice they will fight the application of the mills for higher steel duties at this time.

RESEARCH



PROTECTIVE clothing of worker at G-E atomic energy plant lends outer-space air.

◆ WHAT'S AHEAD for atomic energy in industry? What problems confront this growing field before it reaches maturity? What progress has been made to date?

These and other questions were brought out at the fourth annual conference on atomic energy in industry sponsored by the National Industrial Conference Board.

What They Say

For the most part, the answers were on the optimistic side. But a feeling of concern was apparent over the shortage of manpower trained in peacetime applications of nuclear energy:

"The demand for men trained in the peacetime uses of atomic energy greatly exceeds the supply today and will continue for some years to come unless drastic steps are taken to alleviate the situation, particularly in the nuclear reactor program."—J. Barton Hoag, Assoc. Director, School of Nuclear Science and Engineering, Argonne National Laboratory.

The atom has already carved a niche for itself in metallurgy:

"We are not missionaries in the cause of atomic energy. However,

ATOMS: What The Experts Say

Atoms-for-industry forum confirms optimistic outlook . . . But problem of trained manpower is becoming a real challenge . . . Bureaucratic red tape criticized.

we have been forced for hard business reasons into using radioisotopes to solve our engineering and economic problems. There has been a tremendous increase in the amount of radiography we do. Whereas formerly we radiographed only certain alloy steels and certain critical pressure parts, we are now in our fourth job where all the welds are radiographed . . . We found a solution in high level radioisotopes. Today's costs are 1/10 to 1/1000 former costs. . . . Industry must demonstrate and insist that practical atomic energy laws are possible. This is a first consideration for atomic energy in industry . . ."—Charles H. Voelker, The M. W. Kellogg Co.

In research:

"Although a bit of the glisten and glamour may have worn off the concept of using radioisotopes as a research tool, the results achieved continue to be as spectacular as ever. The tool itself has been sharpened largely through technical improvements in radiation detection devices, automation, and the coordination and combination of radiochemistry with a variety of other research tools."—R. R. Baldwin, Director Biochemical Laboratory, General Foods Corporation.

Its future is assured in electric power generation:

"By 1975 we may be generating electricity from nuclear stations, at an annual rate equivalent to 40 million tons of coal . . . Subsequent reactor development may well reduce nuclear costs below those of conventionally fired stations."—Rt. Hon. Lord Citrine, Chairman, Cen-

tral Electricity Authority of Great Britain.

And further:

"Enough information about reactor construction is finally available to analyze the rate of growth of the atomic industry . . . During this 'growing up' the world atomic enterprise is doubling every two years, though it is still very small compared to conventional power production. As the industry matures the rate of expansion will naturally be less rapid, doubling every four years so that by 1980 twenty-three pct of America's power will come from the atom."—S. Untermyer, Industrial Atomic Products Study, Atomic Power Equipment Dept., Atomic Products Div., General Electric Co.

On the pros and cons of liquid versus solid fuels:

"Despite many attractive features of liquid fuels for reactor use, solid fuels remain far ahead in the race. This can be attributed to several reasons. First, the majority of effort for the past fifteen years has been applied to solid fuels, and nothing can fully replace the experience of long term operation. Second, corrosion and mass transfer of the containers, piping, valves, etc., by the hot moving fluid is a problem of the greatest magnitude and not yet fully resolved. It is believed that the long range future will find both types of fuels in widespread. Reactors will be used for purposes other than commercial power . . . and special requirements will be associated with each use."—Bernard Kopelman, Chief Engineer Atomic Energy Div., Sylvania Electric Products Inc.

FLOW-OF-FUNDS: An Economic Barometer

Federal Reserve Board develops new accounting system . . . Records condition of any part of national economy . . . Establishes trends and indicates future developments—By N. R. Regeimbal.

• A NEW NATIONAL economic barometer, the "flow-of-funds" accounting system, has been perfected by Federal Reserve Board statistical experts after nine years of testing and correcting.

The new technique is expected to give businessmen a better insight into markets and consumer habits, and provide reliable advance warnings of economic developments. But it will take time to become fully effective.

Trace Dollars

Basically, the new system traces each dollar from its source through various hands forever. It may be a dollar's worth of cash, credit, or barter. It may go from the government, to a consumer, to businessmen, banks, stock broker, back to consumer or to business. It may wind up anywhere.

The government keeps track of this traveling dollar with a highly complicated, technical system of cross accounts and multiple-entry bookkeeping.

Simplified, here's how the flow-of-funds system works: Flow of funds arise in all transfers of existing assets, as well as in purchases and sales of current production, and in exchanges of portfolios. It does not arise in internal bookkeeping exchanges — two or more parties must be involved. For flow-of-funds purposes, the economy is broken into 10 major groups:

Consumers; corporate business; non-farm and non-corporate business; farm business; federal government; state and local governments; banking system; insurance; institutional investors; and the rest of the world. Each sector has an account, which records its purchases and sales of commodities and services, its credit and capital outflows and inflows, and the changes in its monetary balances. Each transaction has at least four entries—a purchase by the buyer, a sale by the seller, a reduction in the account of the buyer, and an increase in account of the seller.

What does the flow-of-funds system show?

It shows how funds are flowing through the economy in any given period. At present only annual figures are available. But as the system begins to function more smoothly, quarterly calculations are planned. It makes it possible to observe changing patterns in utilization of credit and capital markets as fluctuations in production and consumption occur.

The Answers

As an illustration of what flow-of-funds accomplishes, FRB can through the system give detailed answers to puzzlers like this: How did consumers as a group make purchases of goods and services amounting to \$238 billion in 1953 when the funds available to them from cash wages and salaries amounted to roughly only three-fifths of this amount, and investment income of various kinds only one-fifth, leaving a "shortage" of \$60 billion.

One-third of the "shortage" came from sale of tangible capital assets, including houses and other real estate and automobiles. A little more than that came from insurance benefits, pension receipts, gifts, and public and private aid. Tax refunds accounted for \$3 billion.

Consumers financed the remaining \$11 billion of the "shortage" through borrowing, one-third of it from banks. About \$6 billion of the borrowing was for homes, and \$5 billion for other purposes.

(For a complete, technical discussion of the flow-of-funds system, write to the Federal Reserve Board, Washington 25, D. C., for a copy of the October, 1955, issue of the "Federal Reserve Bulletin."

■ FLOW-OF-FUNDS

A new accounting system . . . Technique developed by Federal Reserve Board . . . Tested and corrected for nine years . . . National economic barometer that works . . .

Establish Trends and Conditions in Each of 10 Groups—

- Consumers
- Corporate business
- Non-farm, non-corporate
- Farm business
- Federal government
- State & Local government
- Banking
- Insurance
- Institutional investors
- Everyone else

Follow a dollar . . . cash, credit, barter . . . from source to finish.

Assault:

Army sees tomorrow's troops using flying tanks.

Flying tanks and personnel carriers are visualized by Army planners of future operations as the means for giving new mobility to ground combat units.

Fast-moving assault troops, supported by vertical takeoff (VTO) planes armed with cannon and rockets, will remove some of the static aspects of war by 1970, the Army believes.

Limitations created by both natural and artificial terrain barriers would be overcome by the airlifted forces.

Safer Approach

Current thinking on the Army of the future goes much farther than the helicopter-aided phase which is still in development.

The idea now is to bring U. S. troops closer to enemy positions in the tanks and personnel carriers, less vulnerable to ground fire than are the 'copters, for swift, decisive action.

Lightweight metals would be used in the tanks, which would be lifted by equipment of the "flying platform" type atop the turret. Tanks would be expected to fly only a few miles at a time before rolling into action.

The personnel carriers, though capable of flying greater distances than the tanks, would be immobile on the ground. Each would carry about five men, who would be protected from small-weapons fire by the armored hull.

Hush:

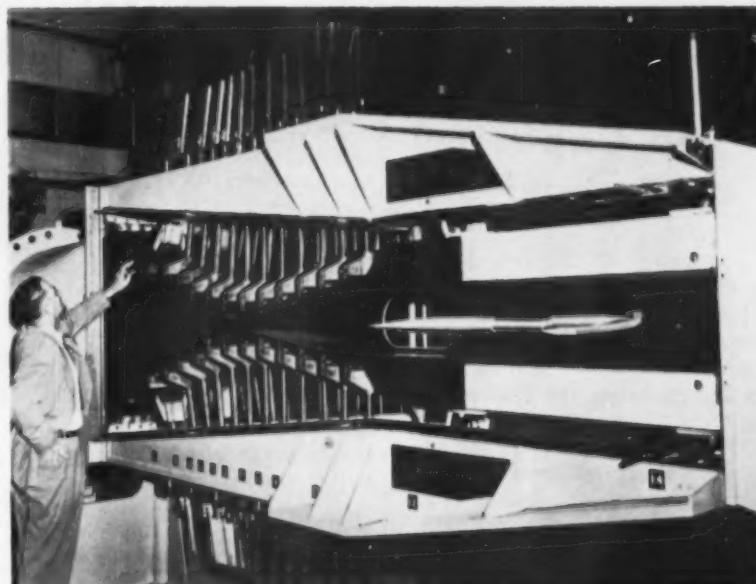
Pentagon clamps lid on unsuccessful bid data.

Unsuccessful bids on negotiated military contracts are being hidden from public view by a black-out curtain deliberately installed by the Defense Dept.

Withholding of the full facts on bids quoted is new so far as stated intentions are concerned, though the military has for some time kept quiet about unsuccessful bids, as a matter of practice.

Avowed reason for its secrecy

DEFENSE



FLEXIBLE NOZZLE controls air flow into test section of wind tunnel at Air Force's Arnold Engineering Development Center. One of Air Force's highest-speed tunnels, system uses compressed air from 720 ft flask.

policy is the Pentagon's contention that both the government and individual bidders are thus protected from "unfair" disclosures.

Negotiate Many

A clampdown on data involved in the procurement process, according to Pentagon views, is needed to prevent hesitancy of suppliers to offer their goods and services.

Indications are that more than half the huge purchase orders placed by the military are awarded through negotiated bids. The Pentagon does not reveal the extent of total contracts placed in this manner.

An example of the clampdown on bid information was provided by the recent award of the fifth supercarrier contract by the Navy to New York Shipbuilding Corp. for \$119.8 million. In Navy parlance, the winning bid was lower by a "substantial" sum than the offer of the Newport News (Va.) Shipbuilding & Drydock Co.

The Navy declined to name the amount of the unsuccessful bid, asserting that the figure was con-

fidential, but the Newport News firm then gave the Navy permission to reveal the amount which had been bid. It was approximately \$126 million.

Grant Fast Tax Aid

Railroads, rushing to get orders placed for new freight cars before the government's fast tax amortization benefits die Dec. 31, have received rapid write-off benefits for some \$100 million worth of new cars.

Office of Defense Mobilization granted 24 separate fast tax certificates for freight cars in the two weeks ending Nov. 2. Largest single certificate goes to the New York Central Railroad Co., which received authority to write off 85 pct of \$20,375,000.

Other certificates in the two week period went to United States Steel Corp., Alpheus, W. Va., 35 pct of \$12,000,000 for metallurgical coal; Republic Steel Corp., Canton, O., 90 pct of \$2,700,000 for titanium melting facilities, and Anaconda Co., 75 pct of \$3,390,000 for copper ore concentrating facilities.

EXPANSION IN INDUSTRY

Up Capacity:

National's goal is to add million tons by 1959.

National Steel Corp. is set to spend \$200 million on a three-year expansion program designed to increase their capacity 1 million tons by 1959. This would be a 17-per cent increase over the present capacity of 6 million tons.

All of the improvements and additions will be made on the National plants at Weirton, W. Va., Buffalo, Detroit and Terre Haute, Ind. According to Ernest T. Weir, chairman, this program will bring all of the existing facilities to their maximum production rates. Any further expansion would have to take the form of new installations.

The only new installation planned by 1959 is a new fabricating plant at Terre Haute.

No new bessemer converters are included in the plans. All of the new basic steel making equipment will be openhearth type.

Pig iron capacity will be boosted through improved ore sintering facilities.

Ask Atom Engine Bids

Manufacturers are being asked by the Federal Maritime Board to offer proposals and prices on atomic power plants for a tanker and a merchant ship.

If Congress authorizes funds, says Maritime Administrator Morse, the nuclear engine will be installed in a tanker-type ship by June, 1959. Target date for operation of the second vessel is June, 1961. Mr. Morse contemplates better technical and economic performance from the second power plant.

A House-passed bill to provide for a merchant ship with a nuclear

engine is in the hands of the Senate Commerce committee. A companion measure was not acted on by the committee during the past session.

India Steel Mill

Kaiser Engineers Div. of Henry J. Kaiser Co. will design and construct a \$130 million steel plant expansion for the Tata Iron and Steel Co., Ltd., at Jamshedpur, India.

The project, one of the largest steel plant construction jobs ever awarded an American firm, will increase India's current steel capacity by about 45 per cent, raising the Tata plant capacity from 1.3 to 2 million ingot tons.

Expansion Briefs

Yawata Iron & Steel Co., Yawata, Kyushu, Japan; modernize steel plate rolling facilities; total cost \$15.6 million.

General Electric Co., Schenectady, N. Y.; improve and expand general engineering laboratory; \$1.4 million.

U. S. Steel Co., Homestead District Works, Homestead, Pa.; new office and administration building; five stories finished in stainless steel and colored porcelain enamel.

Ekco Products Co., housewares manufacturer Chicago; new two-story office building, part of Southern California division expansion; \$1.25 million for entire program.

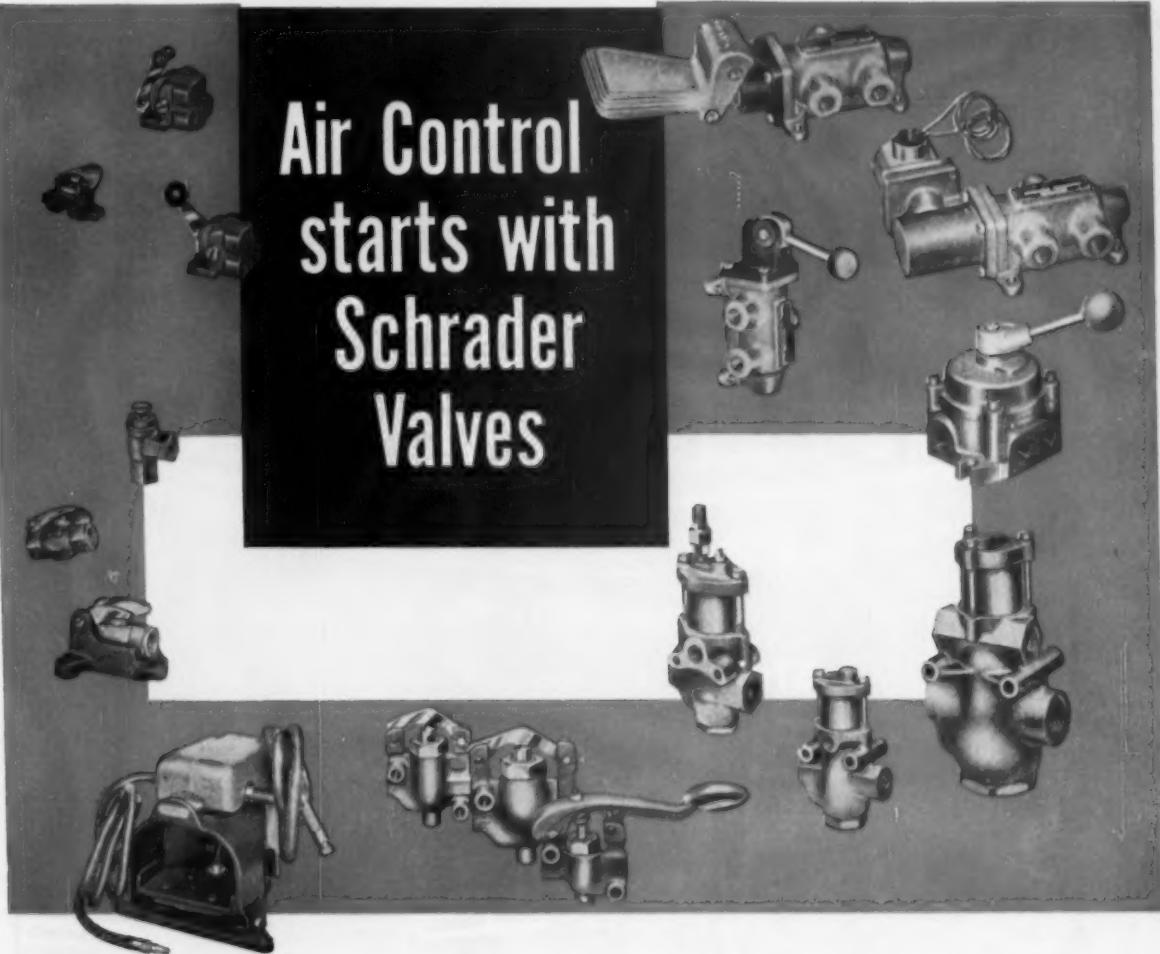
Westinghouse; addition of 66,000 sq ft to lamp division, Fairmont, W. Va.

E. H. Titchener & Co., Binghamton, N. Y.; additions to welded wire plant includes electropolishing process, plating equipment and 70-ton stamping press.



CONVEYOR totes 600 tons of bauxite ore every hour in a continuous flow up a 250 ft hill to a stockpile to await rail shipment. Installation is at Kaiser Bauxite Co. deposit at Comfort, Jamaica, BWI.

Air Control starts with Schrader Valves



Controlled compressed air has given Industry muscle-saving power to produce more . . . economically . . . without fatigue . . . more safely.

Compressed air has become a must in every plant. If you are not now using it, investigate it. And—wherever you actually use compressed air—you'll make its use more effective if you use the best valves possible—Schrader Valves. They are designed and built by a company whose success

dates back to 1844—more than a century of experience in air control.

In the complete line of Schrader Valves you'll find two-, three- and four-way models . . . for hand, foot, cam, pilot or solenoid operation . . . for practically any application.

Find out how Schrader Valves can put compressed air to work to save you money. For specification data, write—or, if you prefer, fill out the coupon below.

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The complete Schrader line of pneumatic accessories includes everything you need

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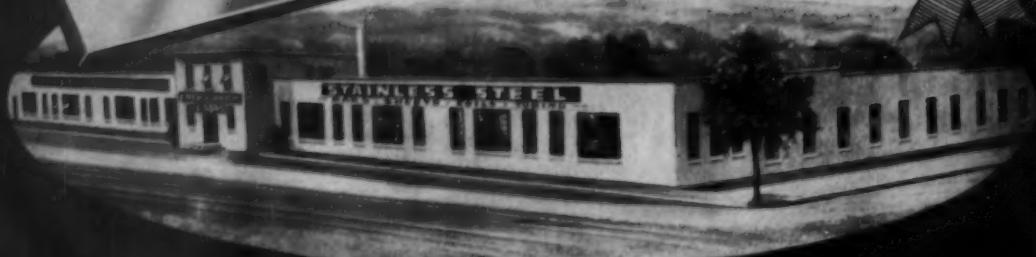
I am interested in more information on _____

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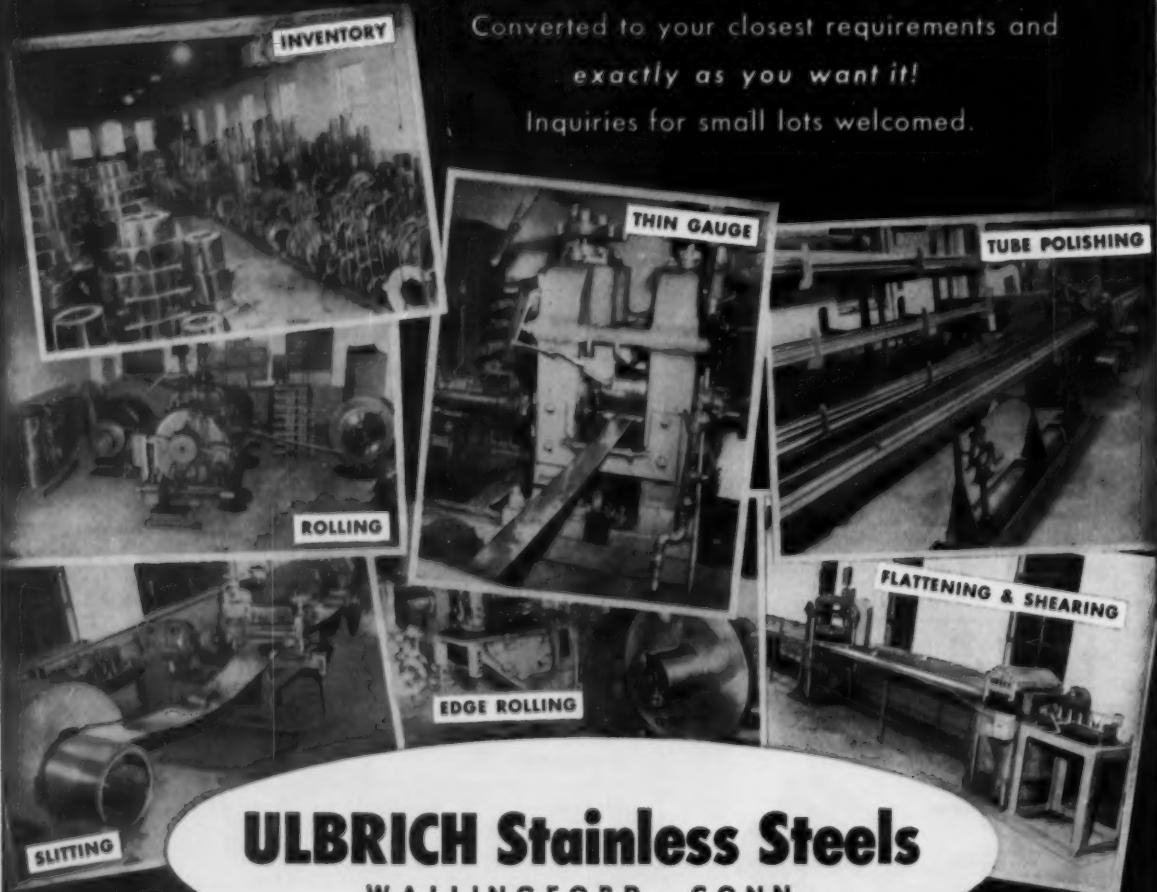


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And Roebling galvanized wire can be packaged in the way most convenient and economical for you...in coil diameters of 60", 30", 22", 16" and 8"...on reels, spools or handy spoolless cores.

You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! John A. Roebling's Sons Corporation, Trenton 2, New Jersey.



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JACKSON ST. • DETROIT, 919 FISHER BLDG. • HOUSTON, 6216
NAVIGATION BLVD. • LOS ANGELES, 6340 E. HARBOR ST. • NEW
YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1950 E. 2ND ST. •
PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. •
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CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR
ST., NEW YORK

Second No. 24 Hydraulic and finished propeller shafts.



from GISHOLT No. 24 AUTOMATIC LATHES

For speed and precision on these hefty drive gear and propeller shafts, production is divided between a pair of Gisholt No. 24 Hydraulic Automatic Lathes. The first machine gets the 275 lb. steel forging for nine different turning, chamfering, and facing operations on the 16" gear blank and five-shaft diameters. 12 minutes later, the part moves to the second machine where nine tools perform similar work on the other side of the flange. Time again is 12 minutes.

Together, the two No. 24 Hydraulics remove a total of 75 lbs. of material. One man operates both machines. Another tough job handled to perfection by these high production machines.

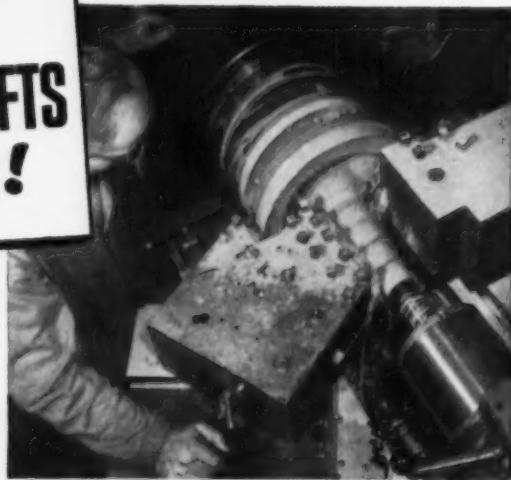
The Gisholt No. 24 Hydraulic, like the famed smaller No. 12 combines ease of setup with exceptional speed and accuracy—all with fully automatic operation that means low costs on any job. If you have work up to 24" diameter, you should have full details on the rugged, powerful, No. 24 Automatic.

GISHOLT

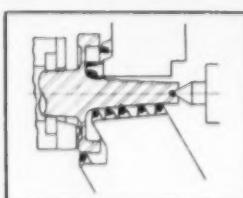
MACHINE COMPANY

Madison 10, Wisconsin

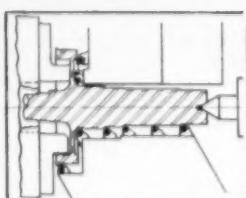
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



First No. 24 making chips on small end of shaft.



Tool arrangement for first operation.



Tool arrangement for second operation.

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



PLANNING

Report to Management**Geneva, Defense and Taxes**

You will feel the effects of Geneva for some time to come. Failure of the conference may not be critical, but it means there will be no gambling on defense.

You can expect defense spending to go up, in spite of initial statements that indicated no change in defense plans. The Cold War is still here and you will have to count on its continuation.

This means there will be few, if any, defense cutbacks for some time. It may mean some difficulty in obtaining the balanced budget and another roadblock in the way of reduced taxes.

The Administration will make every effort to keep defense spending at close to today's anticipated needs. But just the climbing costs of defense materiel would require a greater outlay, Geneva or not.

The increasing complexity of tools of defense require higher cash outlays, more money to pay the technicians who maintain and operate them.

Another possibility—a rearrangement of our military bases around the world. You can anticipate at the least a second look at their locations and strength. A wholesale change in plans would be very costly for everybody.

Upward with the Index

Federal Reserve Board's index of production stayed at the record September level through the month of October, with the seasonally adjusted rate remaining at 142.

Even though October showed no increase, it was a record month and there's no reason to expect a falloff. Seasonal adjustments actually reduced this month's figures.

And seasonal factors will not apply to the same extent next month. You can expect the October production rate to continue through the first of the year, with the result that more new records will be set.

It's Almost Guaranteed

So far in November, big increases are noted in durable goods, both consumer's and producer's. Auto and truck production rates are climbing and steel remains at capacity, and straining to up its sights if possible.

The adjusted index has set records every month since May. It may have to level off sooner or later, but that point does not appear to have been reached. You can look for another point or two climb in November, probably another in December. Recovery of durable goods, machinery and other producer's equipment will keep production soaring.

Courts Look At Stock Plans

If your company has a stock plan for employees, keep an eye on a case now before the U. S. Supreme Court. Outcome of the case will affect the growing use of stock purchase plans at cut rates to attract or keep key executives.

An appeals court decision says the government may not tax the difference between market value and the reduced purchase price granted the employee—if the purpose of the sale is to permit the employee to acquire a proprietary interest in the business.

The government's contention is this ruling gives a company official economic gain free of the tax burden of other compensation. If the government is successful in having the decision over-ruled, it would have the effect of destroying many tax incentive plans. You may have to re-evaluate your firm's incentive program, or take a second look at your own stock if you are in a similar program.

INDUSTRIAL
BRIEFS

Acquisition . . . H. K. Porter Co., Inc., Pittsburgh, has exchanged \$6 million worth of its new 4½ pct preferred stock for all of the business, assets and subsidiaries of Henry Disston & Sons, Inc., Philadelphia, 115 year old manufacturer of saws, files and steel tools. Porter also acquired Carlson & Sullivan, Inc., Monrovia, Calif., which will operate as a part of the Henry Disston Div., H. K. Porter Co., Inc.

Merger . . . Consolidated Chemical Industries merger with Stauffer Chemical Co. has been approved by stockholders of both companies and is expected to become effective this month.

Branch Office . . . Arthur D. Little, Inc., consulting research firm, Cambridge, Mass., is opening a branch office in Washington.

Uranium Ore . . . The president of Vitro Corp. of America has announced that it will process the uranium ore output of Hidden Splendor Mining Co., an Atlas Corp. subsidiary at Vitro's Salt Lake City mill. Project must be approved by the AEC.

Mining Operations . . . Lithium Corp. of America, Inc., expects to place its South Dakota mining operations on standby basis in 1956 due to surplus inventories of raw materials.

Trucks . . . The trucking industry has more than doubled its fleet of trucks and has tripled its tax payments within the last 10 years, according to the American Trucking Assn.

Warehouse . . . L. B. Foster Co. has leased 64,700 sq ft from the Erie Railroad to construct a new warehouse in Buffalo.

Appointed . . . McBeth Machinery Co., Pittsburgh and Philadelphia, has been appointed distributor in these two areas for Pines Engineering Co., Aurora, Ill.

Contest . . . A \$1000 prize contest for engineers and designers for the best new applications of thin gauge and/or high precision tolerance stainless steel strip, has been announced by American Silver Co., Flushing, New York.

Research Activities . . . The Common Cold Foundation has been established to secure support for research activities in an effort to reduce the \$5 billion annual cost to industry of the common cold and allied respiratory diseases. President of the foundation is John P. Syme, vice president of Johns-Manville Corp.

Construction . . . New construction expenditures are expected to reach a record-breaking total of \$44 billion in 1956, five pct above the \$42 billion peak for 1955, according to estimates by the Commerce and Labor Depts.

Driver Protection . . . Roadway Express, Inc., a leading motor carrier, is installing harness-type driver safety belts in several of their cross-country trucks.

Soviet Manpower . . . During the last quarter century, the Soviet Union graduated about 682,000 engineers as compared to 480,000 in the U. S., according to a study by Nicholas DeWitt, published by the National Science Foundation.

Sales Office . . . Salem-Brosius Inc., Carnegie, Pa., has announced the opening of a sales office for its mechanical equipment and materials handling equipment lines in Detroit.



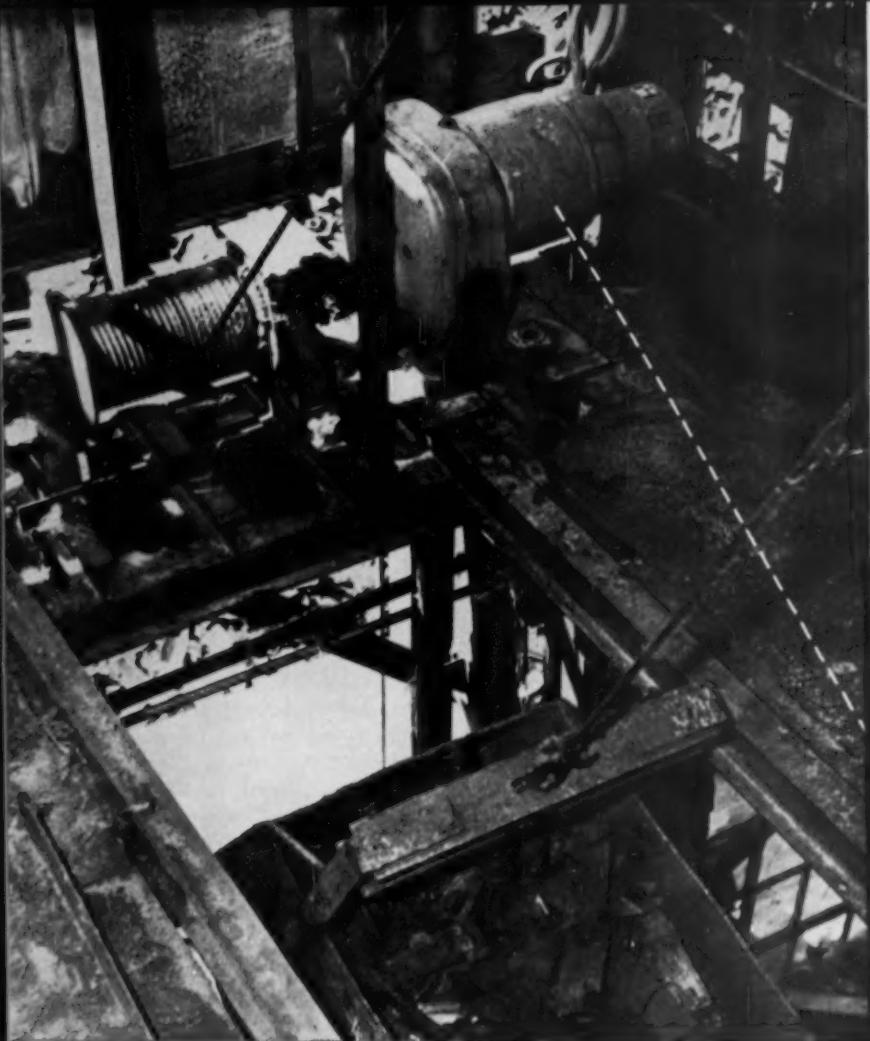
WAYNE PANKOW, new Iron Age business manager, will cover Lake County, and part of Cook County, Ill., Wisconsin, and Minnesota.

Forging Ahead . . . Continental Can Co., Inc., will borrow \$25 million from Metropolitan Life Insurance Co. and New York Life Insurance Co. to provide additional working capital for aid in financing new facilities, in improvements and expansion during the next five years.

New Plant . . . Alloy Steel Casting Co. has begun operations in its new foundry at Southampton, Pa. Also part of the expansion is a new \$500,000 office building featuring a multi-colored enameled steel exterior.

Sales Record . . . On a basis of a \$50 million increase in first half of 1955 bookings, Allis-Chalmers Mfg. Co. expects to enjoy record sales for the year.

Aid to Education . . . Jones & Laughlin Steel Corp. has established a \$115,000 per year scholarship program to aid students who find it difficult to pay the costs of higher education.



STANDARD BRAKE SHOE CHOOSES SLO-SPEEDS FOR RUGGED SERVICE

The power drive on our cupola charger has to take a lot of punishment, reports Mr. J. R. Karlovic, Plant Supt. for Standard Brake Shoe and Foundry Co., Memphis... and Slo-Speed with motor mounted brake gives us the dependable, trouble-free service we must have for day-in, day-out operation, carrying a load of 2500 lbs. and making 25 round trips per hour to keep our cupola charged with metal, coke and limestone.



INDUSTRY NAMES SLO-SPEED PRODUCTION ADVANTAGES

In a nation-wide user survey of Sterling Slo-Speed Geared Electric Power Drives:

86% Lowered Maintenance Costs. **56%** Increased Plant Safety. **76%** Reduced Lubrication Requirements. **56%** Obtained Better Protection Against Outdoor Exposure. **46%** Required Less Installation Space. **40%** Achieved Greater Cleanliness. **10%** Reduced Power Costs. **22%** Increased Production. **56%** Simplified Installations. **32%** Improved Employee Morale.

12% Achieved Quieter Operation. **38%** Modernized Equipment and Machines for Better Performance, Better Appearance.

Investigate the possibilities of bringing some of these Slo-Speed production advantages to your plant. Sterling Engineering Sales Offices and over 400 Distributors and Service Shops throughout the nation effectively serve every industrial, commercial and agricultural area.



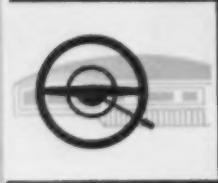
There Is a Sterling Electric Power Drive to Meet Virtually Every Requirement
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WANTED: The Perfect Transmission

Automakers still search for ideal transmission . . . Should be infinitely variable, provide best economy . . . Transmission and engine will have to be united as unit . . . SUB still alive—By T. L. Carry.

ALTHOUGH PUSH button transmission controls have been introduced on some of the 1956 cars, engineers are still a long way from realizing the creation of an ideal transmission for an automobile.

Adopting push buttons to operate a transmission is a significant but not a great engineering problem. Improving the transmission itself opens up a broad field for further investigation.

The search for an ideal transmission has been going on in automotive circles since the time the first car was produced. All types of transmissions have been tested at one time or another. These range from the sliding gear type to the electric transmission.

What's Needed . . . It is generally agreed that five requirements must be met to obtain an ideal transmission.

First two are elimination of the

clutch pedal and hand gear shifting. Next, the transmission must provide added safety by making driving easier. Fourth, the transmission should be infinitely variable; that is, it should provide the ideal ratio needed for every driving condition. Last, the mechanism must be able to take full advantage of the inherent economy of a car's engine and at the same time provide required performance in acceleration and hill climbing ability.

The first three requirements have already been met but the last two can only be developed through a knowledge of both transmissions and engine design.

Engine Improvements . . . The transmission must be built so that it automatically takes care of the inherent limitations of a gasoline engine. At the same time, improvements in engine design can eliminate some of the limitations.

The search for the ideal engine-transmission relationship is continuing and further improvements will come through the development of a combined engine-transmission system in one package.

Specific transmissions for specific engines is part of the answer. A Packard transmission, for example, would not work as well on an Oldsmobile engine and vice versa.

Realization of the infinitely variable transmission is still a long way from reality. In the meantime, engineers are concentrating on ways to improve present mechanisms so that they give both better performance.

Each Has Assets . . . Today's Hydra-matic is considered efficient because it retains the gears of a manually operated transmission and thus provides more economy through fuel savings.

Torque converters give the best performance because their operation is smoother.

Two notable steps have been taken in this direction for 1956. A second fluid coupling has been added to the Hydra-matic in an effort to eliminate the noticeable shifting of gears as the speed of the car either increases or decreases.

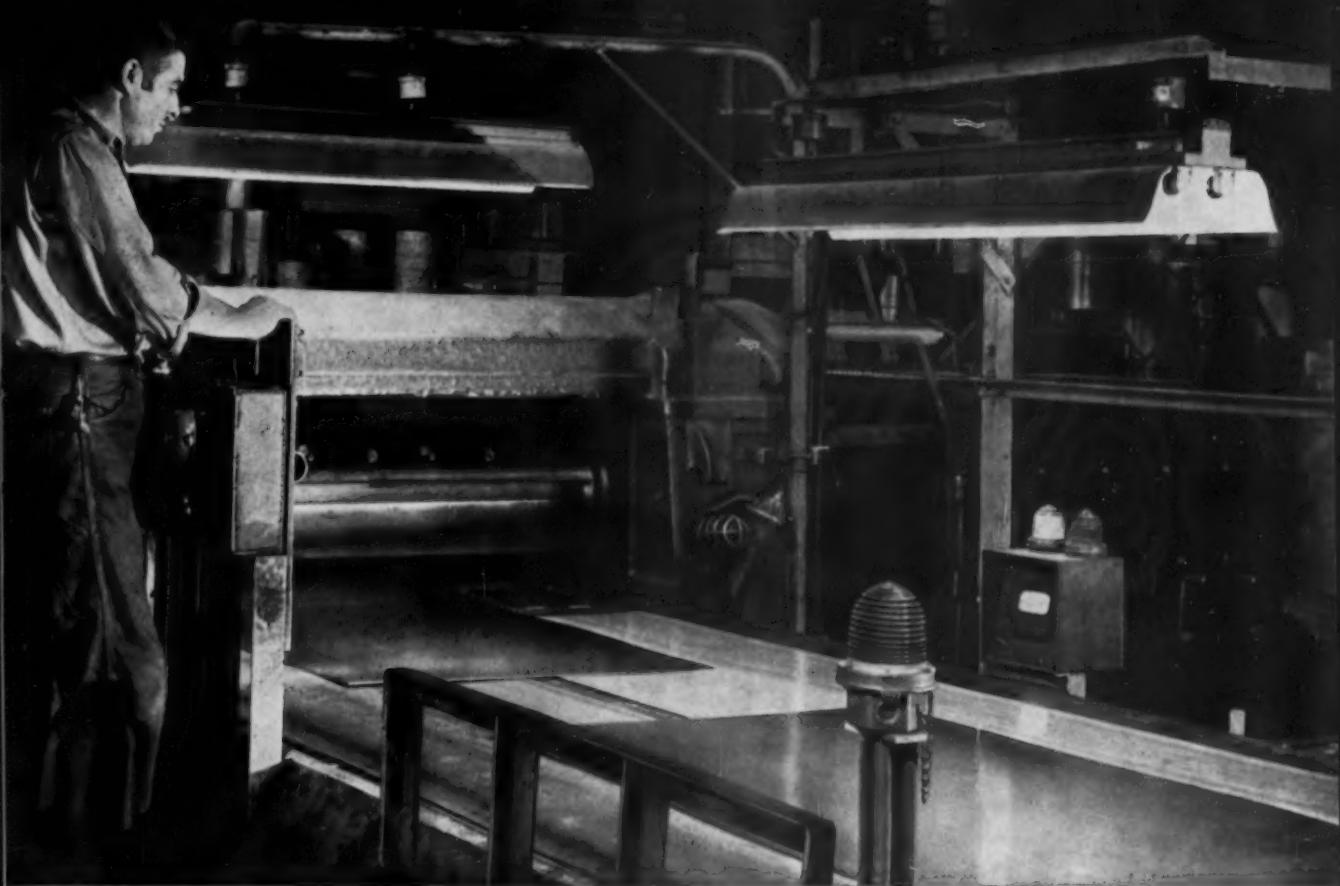
In addition, sprag clutches have replaced conventional bands in the transmission, eliminating the need for periodic adjustments.

In the torque converter field, Buick has made two improvements in the last two years. A variable pitch mechanism was introduced in 1955 and a second stator has been added for 1956.

Was Senate Probe of General Motors a Dud?

What Congress has to show from three weeks' efforts:

- * A warmed-over bill expected from Sen. O'Mahoney to "charter" all corporations, provide for revocation. Never before reported out of committee.
- * A three weeks' bank of testimony, much of it from unfriendly witnesses. It could provide evidence and documentation if the Justice Dept. should launch another suit.
- * A scrutiny of proposed aircraft mergers. Idea is to prevent a "giant monopoly" and avoid domination of aircraft industry by one producer.



How Great Lakes Steel X-rays quality



Above: Stacking sheets after the X-ray check. Below: With dozens of tests passed and uniformity assured, the flat-rolled steel is O.K.'d for wrapping and delivery.



Why do sheets from Great Lakes Steel consistently meet customers' specifications? The X-ray machine is one of the answers. Here an indicator (shown above) signals the thickness of steel sheets as they pass on a conveyor belt. Any sheet failing to meet the established standard is immediately ejected.

Throughout the Great Lakes mills, modern machines and experienced men work together to maintain the consistent quality of our flat-rolled products. Our service includes close contact with customers by Great Lakes representatives, men who are concerned not only with steel production but also with the performance of our steel in the plants of customers.

The next time you have a problem in steel, give us a call. You will find that both quality and service are consistent at Great Lakes Steel.

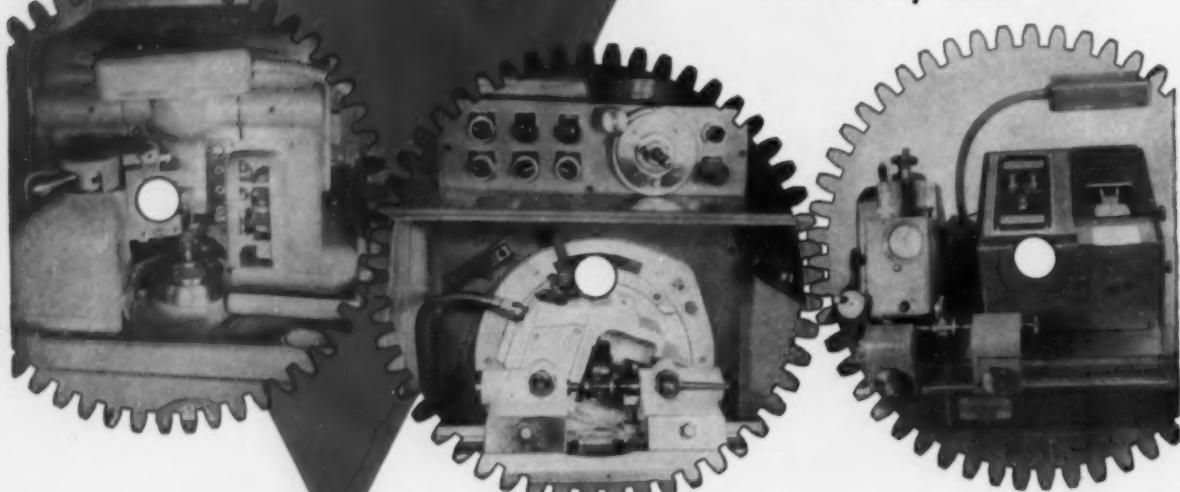
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FULLY INTEGRATED PRODUCTION . . . for Fine-Pitch Gears, too



AT THE NMTB SHOW gear men had the opportunity to see for themselves how quantity production of high-precision fine-pitch gears can be achieved at low cost. Using a Fellows 3-Inch Gear Shaper, No. 4 Gear Shaving Machine, and No. 4 Red Liner Inspection Instrument... all fully integrated... production speeds can be obtained that a short time ago were considered impractical.

Simultaneously, close tolerances can be assured which will meet the most exacting gear-train requirements for electronics and instrumentation.

If you are interested in fine-pitch gears... either as a producer or user, or both... it will certainly pay you to get all the facts about the Fellows fully integrated line of equipment. **WRITE, WIRE, or PHONE** any Fellows Office.

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5835 West North Avenue, Chicago 39
2206 Empire State Building, New York 1
6214 West Manchester Avenue, Los Angeles 45

THE
PRECISION
LINE

Fellows Gear Production Equipment

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Nov. 19, 1955	183,149	28,483
Nov. 12, 1955	186,146	29,075
Nov. 20, 1954	137,377	22,772
Nov. 13, 1954	119,424	22,182

*Estimated Source: Ward's Reports

Sub:

UAW still has chance despite Ohio defeat.

Defeat in Ohio of the CIO-sponsored amendments to the state's unemployment compensation law does not necessarily mean that Ohio voters are opposed to SUB provisions in the UAW contracts with Ford and General Motors.

Approval of the SUB plan was tied in with a big increase in Ohio's unemployment payments. As such, it was unacceptable not only to Ohio industrialists but also to many union workers.

The CIO, by insisting on the all-or-nothing type of referendum in Ohio, outsmarted itself. Chances are, if the SUB proposal was offered separately it would have passed.

Still Goes

Failure to adopt the SUB principle in Ohio does not mean that the plan will not go into effect. There are still several avenues open to Walter Reuther, president of the UAW, for obtaining approval of SUB in states where two-thirds of Ford and GM workers live.

It is generally conceded that there will be no approval now in Ohio either by an attorney general's ruling or a legislative act. It has already been decided that an opinion by the attorney general would not be legal.

Approximately 66 per cent of Ford workers and 57 per cent of GM workers are already covered under the new contract. So Mr. Reuther has until next June to obtain further approval in perhaps one more state for the Ford contract and two or three states for coverage

of GM workers.

Chrysler's contract has already gone into effect because the required percentage of its workers are concentrated in Michigan and Indiana where SUB has already been approved.

Luxury Fleets

Companies which buy large numbers of automobiles for use by their sales people and other personnel are investing their money in more expensive cars.

Formerly, firms which used automobile fleets bought the cheapest model for the purpose. But purchasing agents have found that the cheapest model car does not necessarily save a company the most money.

Fleet users are discovering that a car which has nothing but the essentials is worth less at resale. On the other hand, an auto which has a few extras attached is worth more.

At the same time, the characteristics of the fleet market are changing. Where a company formerly bought low priced fleet cars, it is now investing its money in higher priced automobiles. Be-

AUTOMOTIVE NEWS

sides the economic factor behind the change the question of prestige also comes into the picture.

Fleet users are beginning to feel that a high priced car reflects a great deal on the overall impression a company can give to its customers.

Packard is the latest to take advantage of the growing trend toward more expensive company cars. The division has established a fleet sales department which is going to concentrate on selling luxury cars to industrial firms.

More Colors

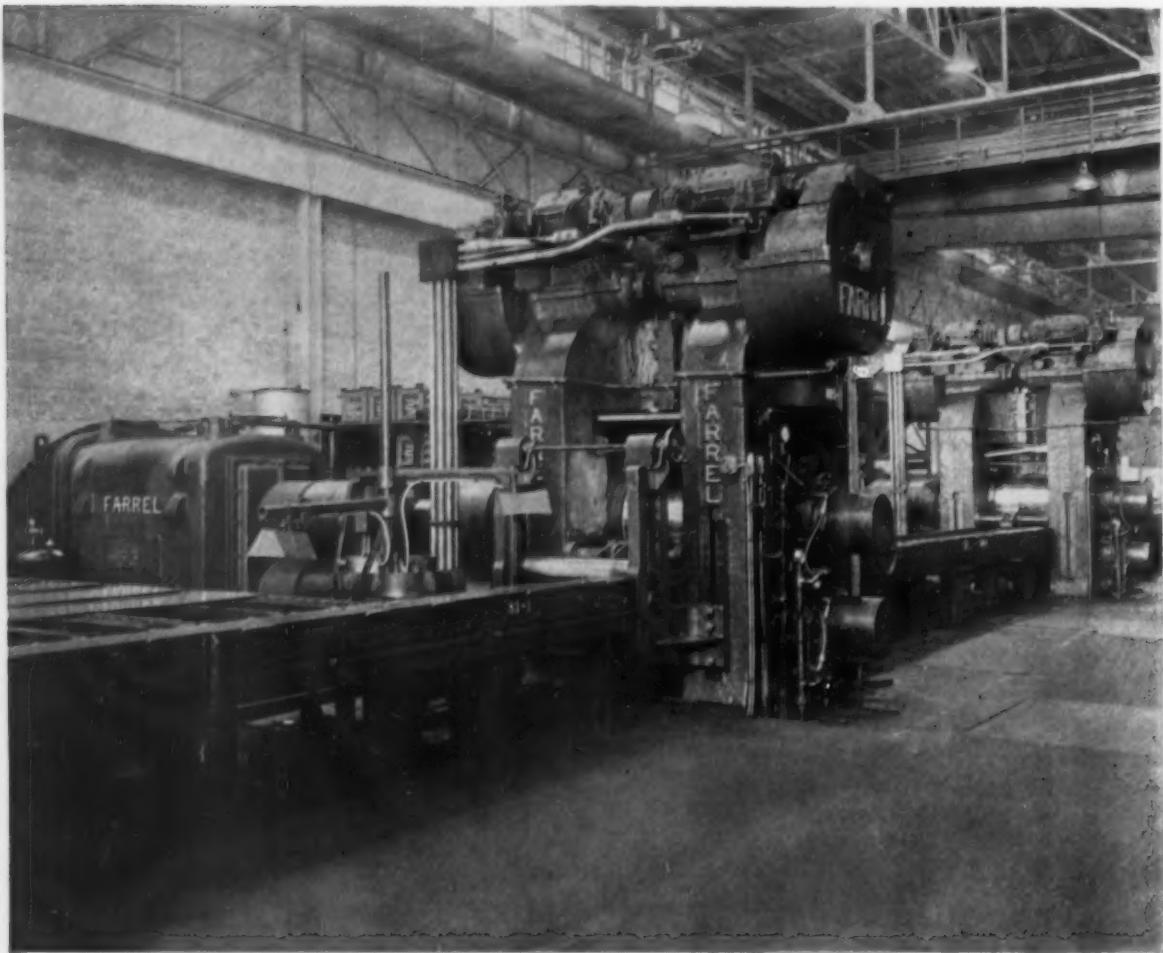
Two-tone body styling, a feature virtually unknown before the war, is definitely here to stay.

Two-thirds of the people who bought 1955 Chevrolets ordered dual colors. In 1954, 50 per cent of the GM division's cars were two-tone.

The 1955 figure covers the entire line for Chevrolet. But T. H. Keating says that in some models the percentage was even higher.

By J. R. Williams





Add years to your gears . . .

ENCLOSED reduction gears and their bearings stay in service longer, run smoother, require less maintenance expense when you use *Texaco Meropa Lubricant*.

Texaco Meropa Lubricant is refined from the choicest base stocks, and further improved by highly effective and long-lasting EP

agents. *Meropa* keeps gears operating dependably, even under shock loads and extra-heavy steady loads.

Other outstanding characteristics of *Texaco Meropa Lubricant* are its resistance to thickening at high operating temperatures, and its high oxidation resistance. In ad-

dition, *Texaco Meropa Lubricant* will not foam, is non-corrosive to bearing metals, and remains stable in use, centrifuging or storage.

You can assure highest efficiency at lowest cost by employing effective Texaco Lubrication. Let a Texaco Lubrication Engineer help you select the proper lubricants for your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

TUNE IN . . . TEXACO STAR THEATER starring JIMMY DURANTE on television . . . Saturday nights, NBC.



What About All This Satellite Talk?

U. S. moves to make space ships a reality . . . Award first contract for launching equipment . . . Satellite specs are in the works . . . Firing due by the end of 1958 . . . Animal "crew"—By G. H. Baker.

• CONTRACT specifications for "about a dozen" earth satellites and related launching equipment are being drawn up at the Pentagon, and the actual awarding of contracts will start within the next few weeks.

First of a series of government contracts to build equipment for travel in space went recently to Glenn L. Martin Co., Baltimore. It was a \$2,035,033 contract for construction of one rocket launching device.

About a dozen man-made satellites, all packed with precision measuring devices and photographic equipment, are to be fired off into space during the upcoming "international geophysical year," which extends from July, 1957, to December, 1958.

Space scientists connected with the international program say they hope to learn the answers to some age-old mysteries about the earth, the sun, and the atmosphere surrounding this and other planets.

In addition to a wealth of precision instruments, each of the satellite "birds" to be fired off into space will carry a "crew" of laboratory animals.

Close Bomber Program . . . The Air Force is beginning to close out its B-47 medium bomber program. More than 1700 of the six-jet planes are now on hand.

All contracts for the complete aircraft are now—or very soon will be—fulfilled, and the few contracts still to be let are for spares and replacement parts.

Six General Electric J-47 turbojet engines are the source of power on the B-47s now being turned

out at Marietta, Ga. (Lockheed), Wichita, Kan. (Boeing), and Tulsa, Okla. (Douglas).

Push Turboprops . . . Turboprop engines, rather than jets, are shaping up as the dominant means of aircraft propulsion of the not-too-distant future.

Some government aircraft engineers believe the bulk of all U. S. commercial flying will be powered by turboprop engines, which cost about 25 pct less than jet engines and have the added advantage of longer range.

Some production features of the turboprop now being discussed in industry-government circles: Mass production by 1961; payload of more than 100 passengers; cruising speed of around 500 mph; power supplied by four 4500-hp turboprop engines; operating altitude 30,000 ft.

Curtiss-Wright Corp. has had some preliminary talks with Bris-

tol Aeroplane, of England, regarding production in the U. S. under patent license.

Spend to Elect . . . Labor unions spent about \$2 million in 1954 to elect the "right" candidates, a new report prepared by Senate Republicans discloses.

Since the imminent merger of the AFL and CIO will result in a unified labor organization of approximately 15 million members, the sums spent by unions to elect candidates who will follow the labor line is "a question of increasing interest," the Senate group observes significantly.

In the 1954 elections, CIO groups spent well over half (\$1,308,872) of the total, the study shows. AFL groups spent \$573,919, and independents (railway group) spent \$95,773. The 86-page report shows in some detail which candidates were on the receiving end of labor's donations.

Study President's Workload

As President Eisenhower settles down at his Gettysburg farm for what looks like a long convalescence, Congress starts talking of ways to ease the tremendous burden that rests with all U. S. presidents.

Special committees of Congress probably will be set up early next year to find ways of lightening the chief executive's responsibilities. It's becoming increasingly evident that even a

strong Cabinet and an able executive assistant (as Ike has in Sherman Adams) still leaves too great a load on the President's back.

No man should be called to occupy a position which offers a simultaneous path toward glory and the grave, says Sen. Bender, R., Ohio. It's a man-killing job, Bender points out, and one that Congress is going to re-define in the months ahead.

Machines too,
develop through

EVOLUTION



LEES-BRADNER

Proudly announces the latest
developments in the model 7 type HD
high speed production hobbing machine

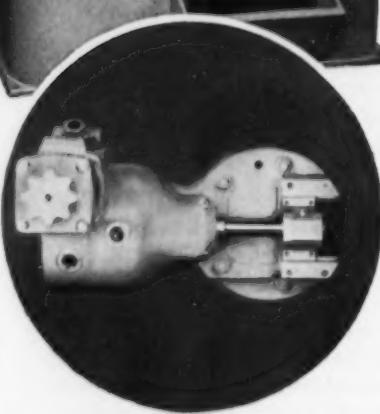
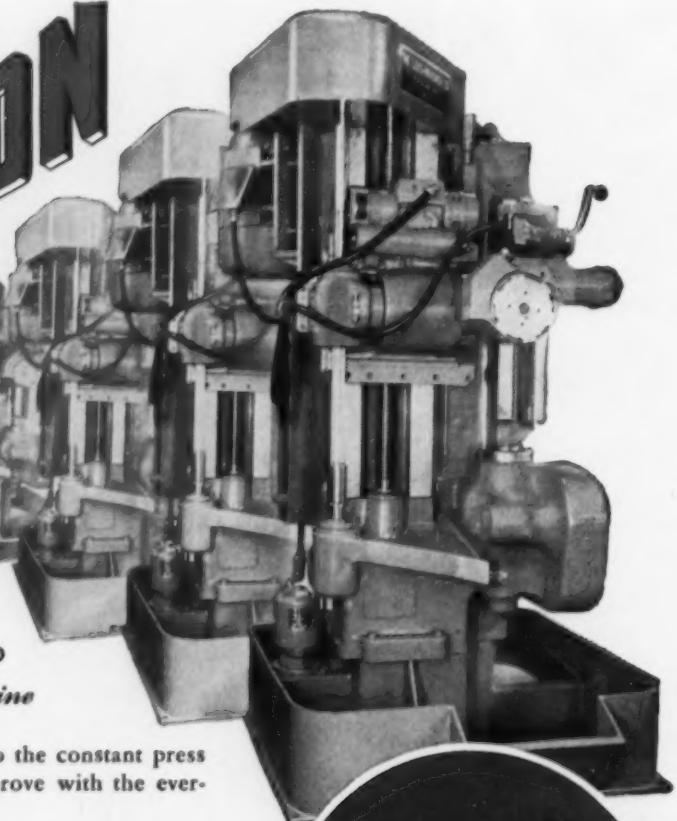
Just as given species improve, giving way to the constant press of nature, so do machines change and improve with the ever-increasing demands of industry.

The Lees-Bradner 7 HD Single Spindle Hobber is a good example. It has moved forward in engineering and design improvements to meet today's and tomorrow's production demands.

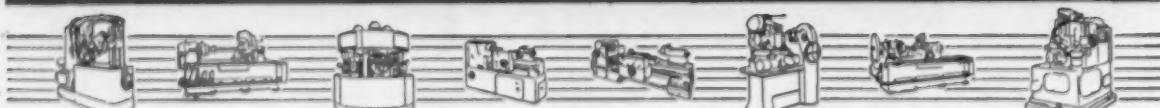
Pioneers in high speed hobbing, The Lees-Bradner Company has, through constant experimentation, created a hobbing machine far superior to its prototype. The new Model 7 Type HD Single Spindle Hobbing Machine offers industry a heavier and faster machine. Weighing approximately 1,000 lbs. more than its predecessor, it has a heavier headstock, heavier column, 10 H. P. motor and 2 H. P. rapid traverse motor.

Designed-in improvements such as these give industry savings in time and labor while meeting today's production demands . . . plus the extra capacity for tomorrow's requirements.

Demonstrations may be arranged on request. Contact your Lees-Bradner representative, or write us direct. No obligation, of course.



The above photographic close-up shows the new, heavier hob head with Timken bearing construction and 3-inch hob shift and new outer support.



MODEL H HOBBER HT THREAD MILLER 7-4 ROTARY HOBERS CRI-DAN THREADING MACHINES MODEL 40 THREAD MILLER SH SPLINE HOBBER 12-5 HOBBER

IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER

Crackdown:

U. S. ends trust exemption, charging defense lag.

Attorney General Brownell is canceling antitrust immunity for 15 small business production pools because they "have shown little disposition to seek defense contracts."

The pools, formed under the Defense Production Act, were among 77 originally granted antitrust immunity to permit small firms to band together to produce defense material they could not produce separately. Four pools will continue, and the remainder have voluntarily broken up.

Any defense potential gained by permitting the 15 pools to continue is "overbalanced by meetings between competitors without government supervision or control," the Attorney general says.

Don't Get Facts

The Attorney General is also criticizing the Small Business Administration for gathering loan information in an "indirect and haphazard" manner.

He complains that SBA does not have a system of gathering information to determine whether firms applying for aid are "dominant" in their industry, and the agency's investigators are not adequately prepared, or asked, to collect necessary facts from applicants. He also thinks SBA should determine what a "fair share" of government contracts for small business should be.

Preference:

U. S. pushes contracts for small business.

Government buyers of goods and services are told to keep the small bidder in mind when placing their orders.

General Services Administration and the Small Business Administration are going to decide jointly which of the many GSA contracts should be handled exclusively by small firms. GSA buys about \$460 million worth of goods and services for the government each year.

As various orders are checked off for handling by small companies, the business service centers in the 10 GSA regional offices and the 14 SBA regional offices and 25 branch offices will be notified.

Test Results

Interested small concerns will get information on bid opportunities from those offices.

A trial run for the joint determination plan began at the GSA office in New York in September. This program has made it possible for the reservation of more than \$800,000 in competitive-bid opportunities for small firms.

Foreign Bid Rules

Ground rules which the U. S. Interior Dept. will follow in administering the "Buy America" Act when foreign bids are involved have been established.

Other government agencies are expected to follow the Interior Department ground rules.

The new rules call for adding 6 pct to any foreign bid to cover possible price adjustments, import duty, and transportation costs from port of entry.

Another 6 pct would be added to foreign bids when competitive equipment is manufactured in a U. S. area certified as having substantial unemployment.

Previously, the Department had considered adding 9 pct for areas

WASHINGTON NEWS

of substantial unemployment. Four foreign firms have received contracts for auto transformers, distribution transformers, power circuit breakers, and outdoor current transformers under the new rules. If the 9 pct figure had been used, Pittsburgh area firms would have won two of the contracts.

Seaway Plans Ready

Plans and specifications, including more than 270 drawings, are now ready for firms which intend to bid on construction of the Robinson Bay Lock of the St. Lawrence Seaway near Massena, N. Y.

Corps of Engineers makes the plans available at the district engineer's office, Niagara and Bridge Streets, Buffalo 7. They may also be examined at engineer facilities at 536 S. Clark Street, Chicago, and 80 Lafayette Street, New York.

Final date for completion of the 860-ft lock is June 1, 1958.

Firms Join "Voice"

American corporations with overseas branches are going to become unofficial arms of the government to cooperate in telling the American story abroad.

Representatives of 20 firms agree to a White House proposal that they form an "industrial co-operation council" among overseas offices to work with the United States Information Agency, parent agency of the "Voice of America."

USIA officials say industry has been helping overseas "education" for some time, but the creation of the council would improve their efforts.

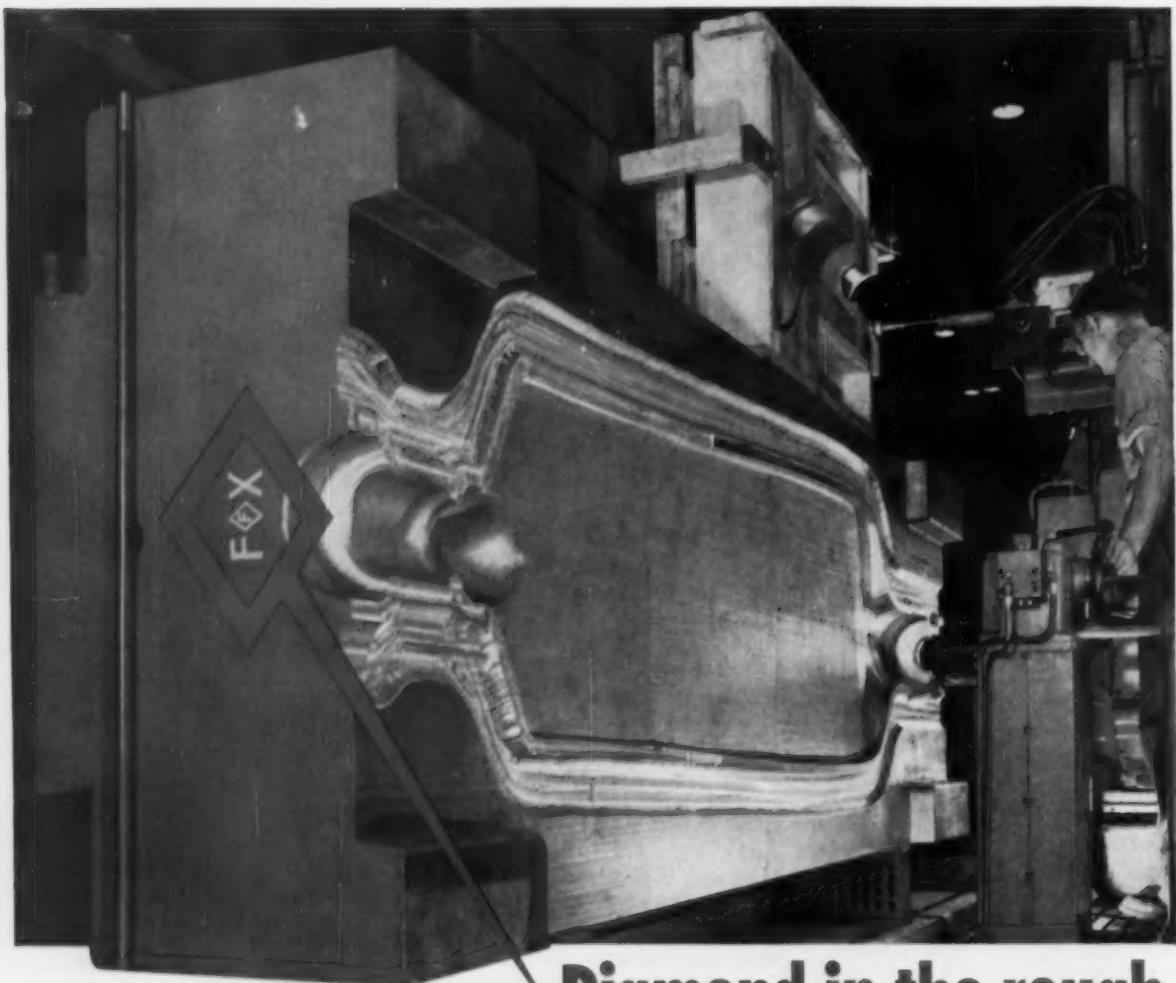
Faster Patents

Use of electronic machines to speed up search processes of the U. S. Patent Office is being considered by a special advisory committee. At present, both search and filing procedures lag.

The special advisory committee was appointed by Commerce Sec. Weeks specifically to determine how machines may be used to speed up Patent Office processes.



"I see Smith is making another personal call."



Diamond in the rough

This 42,000 pound Finkl FX die nearing completion at the Ladish Co., Cudahy, Wisconsin, will be utilized by that firm in drop forging 1681 pound close tolerance aircraft propeller blades. FX is but one of many Finkl steels available for forging operations, all of which are quality controlled with "built-in" characteristics required for precision production. For the proper die steels to fit your needs, ask your local Finkl representative or write for the Finkl catalog.

When you next consider hot work tooling, die blocks, or forgings, call on Finkl for "impressions that last."



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WEST
COAST
REPORT

Plant Dispersal Has Coast in Quandary

Gov't aircraft plant dispersal policy has industrialists in a dither . . . Want official clarification from Washington . . . Three coastal states lead in plant employment . . . L. A. tops cities—By R. R. Kay.

♦ WHICH WAY'S the wind blowing on the aircraft-plant-dispersal policy? Answer has broad significance—affects metalworking's future on the West Coast. Many industrialists are all dressed up with no place to go. Their expansion plans are readied, the money earmarked—but they're in a quandary. They want to know: What is the government's dispersal policy?

Harsh and uncomplimentary talk is heard up and down the Coast. Some say it's politics. Some ask, "How much more dispersal does the country need?"

Others insist the policy doesn't make sense: Moscow is closer to Cleveland, Detroit, Chicago than to Los Angeles. And the government isn't dispersing military production in those highly concentrated centers. Why the West Coast?

Policy a Big ? . . . Nobody, but nobody, here knows what the policy is! And to add insult to injury, every day brings more conflicting developments. The policy, if there is one, seems to zig and zag.

Lockheed was forbidden to build its missiles plant in Los Angeles—too near the Coast. Yet the company just optioned 275 acres, presumably for a missiles plant, in the San Francisco Bay Area. On the other hand, Marquardt Aircraft Co., Los Angeles area, is told to build its ramjet plant inland—away from the Coast. Boeing Airplane Co. just bought 40 more acres for expansion of its Seattle plant—certainly a coastal position.

And to add to the confusion,

Douglas Aircraft Co., Inc., has orders not to build its new, giant transport C-132—probably the world's largest—at its Santa Monica, Calif., plant. Air Force says it's got to go inland—to Tulsa, Okla.

Industry leaders here say it's high time the Pentagon made its policy crystal-clear. And only an unequivocal statement from new Air Force Sec'y Donald A. Quarles will satisfy them.

What all this means to the metalworking industry here is spelled out in **THE IRON AGE**, West Coast Report, Aug. 11, 1955, p. 73.

Make a Note . . . Are you sales and marketing men zeroed-in on your best western markets? Check these latest figures against yours. You may have to update your quotas.

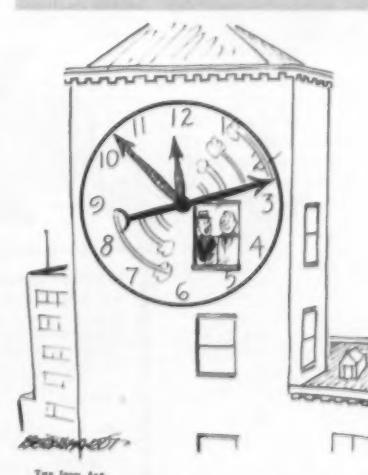
Manufacturing employment in the 11 Western States is 87.7 pct concentrated in three of them: California, 66.8; Oregon, 8.6; Washington, 12.3. The 12.3 pct balance is thinly spread among the eight Mountain States.

To break it down still further, here's how the metropolitan areas show up: Los Angeles is first with a big 41.8 pct., then San Francisco with 11.9; Seattle, 4.9; Portland, 3.9; San Diego, 3.8; Denver, 2.8; Salt Lake City, 1.0.

Here's more about the massive Los Angeles market from the Research Dept., Los Angeles Chamber of Commerce. Los Angeles County's percentage of western employment in major metalworking industries: communication equipment, 84.0; machinery, 72.7; electrical machinery, 72.6; instruments, 72.4; aircraft and parts, 67.4; motor vehicles and parts, 63.1; fabricated metal products, 53.0; ordnance, 42.5.

Heard on the Beat . . . Norris-Thermador Corp., Los Angeles, will build a general-purpose metalworking plant at Waco, Texas. Will make steel JATO subassemblies . . . A \$6 million plant for industrial couplings will go up in Salt Lake City next year, operated by Utah Automatic Quicklock Coupling Corp. and Precision Castings Corp., Syracuse, N. Y.

Power . . . Hydraulic turbines for use in the Glendo, Wyo., power plant of the Missouri River basin project will be supplied to the U. S. Interior Dept. by the S. Morgan Smith Co., York, Pa.



"There's a nice view, but first a word of caution."

YOU PAY NO MORE THAN 59 CENTS PER HOUR

for this new Model C Autometric precision boring machine when put to work in your plant with...

Kearney & Trecker

TOOL-LEASE PROGRAM

THINK of it! You can lease this new Model C Autometric boring machine for as little as 59 cents per hour! It's an exceptionally low price to pay for this modern, high precision-built boring machine, designed specifically for performing the most exacting operations in your toolroom, laboratory or shop.

Under Plan "A," one of three possible lease agreements, you make two semi-annual payments, totaling 25% of the machine's price during each of the first three years. And only 10% during each of the last four years. What's more, this lease agreement permits you to terminate or purchase your Model C Autometric at the end of the third year or at the end of any year thereafter.

Under Kearney & Trecker's Tool Lease program you can rent any of over 250 different types and sizes of standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

MACHINING TOOLS OUTLASTING THE INDUSTRY
CRITICAL WHERE DO YOU STAND?



Precision Mechanisms Industry—Includes machines for laboratory, scientific and engineering instruments; mechanical measuring, controlling instruments; optical, surgical; medical, dental instruments and equipment; photographic equipment; watches, clocks, clockwork devices, and parts.

the total 8,295 machines, 10% are over 20 years old, over 36% are 10 to 20 years old, 10 to 20 years old.

Machines over 20 years old,
which should definitely
be replaced.

Machines 10-20 years old,
which should probably
be replaced.

Machines
less than
10 years old.

882 automatic and manufac-
turing type milling machines

43%	44%
-----	-----

2550 vertical milling machines

30%	66%
-----	-----

4087 knee type horizontal
milling machines

40%	45%
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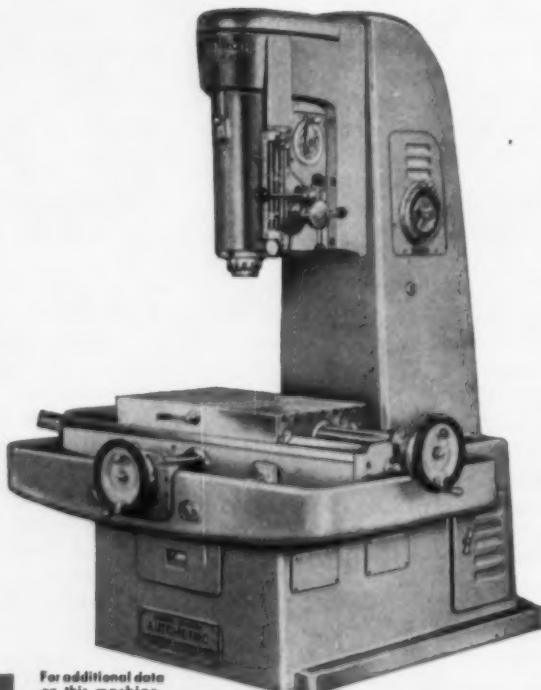
380 bed type milling machines

31%	69%
-----	-----

396 horizontal and vertical
precision boring machines

23%	74%
-----	-----

Figures adapted from 1953 American Machinist survey of Metalworking Industry.



For additional data
on this machine,
see our catalog in
Sweet's.



KEARNEY & TRECKER CORP.
6784 W. National Ave., Milwaukee 14, Wis.
Please send me Bulletin TL-10A on
Tool-Lease Program and booklet titled
"Critical Picture of Creeping Obsolescence."

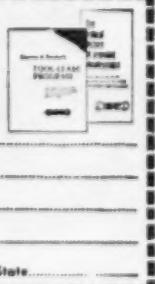
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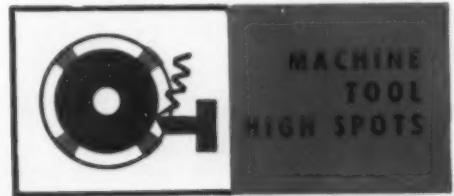
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Are We Stressing Speed Too Much?

Automated processes ring up fancy production figures . . . But some say quality suffers in the drive for quantity . . . Rejects lower net output, make costs climb . . . Urge more care—By E. J. Egan, Jr.

♦ DO AUTOMATION processes place too much emphasis on quantity output, and not enough on quality?

Ernest W. Schneider, president of the National Screw Machine Products Assn., thinks they do.

He told a recent conference of the American Society of Tool Engineers at the University of Illinois: "The theory that because you make more per hour, the cost must be less, is completely in error. This may sound elementary, but I know of no greater fault nor a more common one," he said.

Take One Example . . . Mr. Schneider referred to the screw machine as the "oldest" automation process. In this connection, he said that too often the first operation is speeded up to the point where quality is impaired and additional operations, such as burring and sizing, must be added. In such cases, the cost would be less if the part were run properly at a slower speed.

"Often, when we compare gross production figures," Mr. Schneider said, "they are used for creating impressions. Let us suppress our ego a little and talk net production acceptable to quality control standards and we will, at least, be more realistic."

And Another Thing . . . The questions created by automation's gross production figures aren't the only ones stemming from this much publicized manufacturing technique. A good deal of thought is being given to the effect the spread of automation will have on jobs in general.

Latest group to dignify this question is a congressional subcommittee. In informal hearings on "Automation and Technological Change" it has listened to eminent sociologists, economists, labor leaders and manufacturers.

M. A. Hollengreen, president of the Landis Tool Co., Waynesboro, Pa., and ex-president of the National Machine Tool Builders Assn., presented the viewpoint of his industry to the subcommittee recently.

What It Is . . . He said automation "is merely a general term which covers the most recent developments of the past half century with regard to the speed and productivity of machine tools."

He stressed the fact that be-

cause engineers have been building automatic devices into machine tools for 50 years, they do not regard automation as something new and unforeseen.

Concluding a step-by-step description of an automated setup to grind auto engine valves, Mr. Hollengreen said that it produces 450 finished valves an hour. He explained that maximum production previous to the new installation had been 275 valves per hour.

And he said that extra benefits of the new line included: (1) elimination of human errors; (2) much greater part accuracy; (3) minimum scrap.

Still Need Men . . . However, Hollengreen took pains to assure the committee that the line was not 100 pct automatic. The machines have to be attended at all times, attendants must be well trained and efficient.

He maintained that from many points of view, employees on the new valve line have better, safer jobs than those who formerly did valve grinding work.

"We know from experience that more mechanization means lower costs, more sales, more profits and very much more employment."

He pointed out that firms with the most modern equipment have prospered and increased their employment, and he added that "There is no reason whatever to believe that . . . automation" will reverse this trend.

All of which indicates that automation will bring its share of problems but that benefits will continue to outweigh headaches.



"This is a poor time to ask for a raise, Jones. This happens to be your last week here."

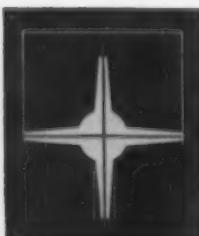
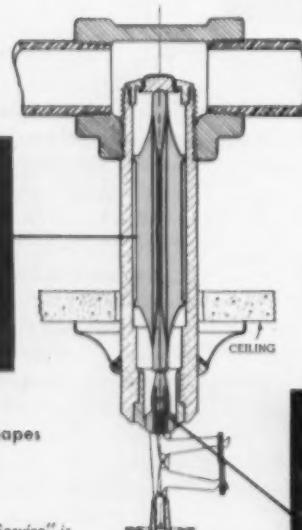


Office with concealed piping,
only the heads showing



REVERE

Cross section of Viking Dry Pendent Sprinkler Head, and cutaway view



Outline of the two shapes supplied by Revere

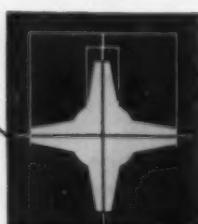
"The Revere Four-Way Service" is a 16mm. sound motion picture in color, educational and informative. If you haven't seen it, write nearest Revere Sales Office.

Extruded Shapes

**in dry pendent sprinkler heads
lessen machining, save money**

Some 16 years ago the Viking Corporation, Hastings, Michigan, decided to find a way to put sprinkler piping for dry pipe systems above the finished ceiling, leaving only the sprinkler heads visible. This meant designing a sprinkler head which would be free of water except when in use. Thus there would be no drainage problem, and no chance of freezing. The dry pendent sprinkler head as finally developed extends into the sprinkler pipe, where a bronze cap keeps the entire valve waterless. When a fire occurs the usual fusible element melts, two struts drop, releasing the cap and permitting water to flow.

In the original experimental work, the two struts were machined out of solid brass bar. This took time and involved the generation of a considerable amount of scrap, since each strut has four deep fins. Once the idea had proved itself, Viking came to Revere for extruded shapes, in order to save both machining and metal. So much time has elapsed since the original machining of the bar that comparative cost figures would be meaningless, but it is evident to Viking, and to everybody familiar with extruded shapes, that the saving is substantial.



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The Iron Age SALUTES

Francis K. McCune

Boss of General Electric's 13,000-man nuclear operations, he occupies a key spot in the conversion of atomic power to commercial use and makes a surprising prediction on the future.

At General Electric, they're talking about atomic power that pays its own way within five years. The company has a 13,000-man stake in economic harnessing of nuclear power, is driving hard toward the new day.

Directing and sparking atomic activity at G-E is California-born Francis McCune. A handsome, smiling man, he flatly predicts unsubsidized atomic power will be with us in 10 years. Maybe sooner. Mr. McCune thinks it's time to take the wraps off commercial nuclear operations. He wants adequate risk insurance provisions for atomic projects. He's all for junking any unnecessary secrecy provisions.

These are the thoughts of a man who's right in the thick of atomic operations. Mr. McCune recently helped nail down a contract for design and construction of the world's biggest all-nuclear power plant. His atomic products division produced the free world's first commercially distributed atomic electric power—at West Milton, N. Y.; was responsible for development of the atomic power plant for the submarine, *Seawolf*.

G-E operates Atomic Energy Commission plants and laboratories across the country, is running development projects at Schenectady all the time.

Mr. McCune knows his atoms and he's well schooled in the business of money-making production. He graduated from the University of California in 1929 with an electrical engineering degree. That same year, he joined G-E as a student engineer. He's been with the company ever since, serving as assistant works engineer at the West Lynn Works in 1945 and assistant to the general manager of the apparatus department in 1948. He is realistic and capable.

In 1949, he became assistant general manager of the Hanford plutonium plant in Richland, Wash. This giant AEC project sprung up during the war under "cost-is-no-object" conditions. Mr. McCune helped trim costs and boost production, gaining close familiarity with atomic work in the process. In 1951 he returned to Schenectady, where he is now a G-E vice president and general manager of the atomic products division.



WHAT—HANDLES LIKE CARBON STEEL?

That's right. 3 times stronger than carbon steel, Lukens "T-1" steel can be welded without preheating or special joint design.

Although Lukens "T-1" steel is a tough, high strength, heat treated steel, equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Recognizing that higher strength steels require higher pressures to form, proper design procedures will permit this low carbon, quenched and tempered alloy plate steel to be fabricated not only in the shop but also in the field. Those items of equipment which may not have to be stress relieved for dimensional stability or other special reasons can be fabricated of Lukens "T-1" steel to take advantage of its tough "as-welded" characteristics.

In addition to easy fabrication, Lukens "T-1" steel has other benefits of equal value to equipment builders. Three times stronger than carbon steel, this new steel has lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. Lukens "T-1"

steel's excellent resistance to the combination of wear and impact abuse lowers maintenance and replacement costs, lengthens equipment life. Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for builders through the use of wider plates that require fewer welded seams.

A new addition to Lukens' complete line of carbon, alloy and clad steels, this new steel's unusual combination of properties suit it especially to applications in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, material selection, application and fabrication techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write to Manager, Marketing Service, 772 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania.



"T-1" STEEL

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

To get the new, 28-page book on Lukens "T-1" steel, ask for Bulletin 781.



CHARLES F. MYERS, appointed president, Morse Twist Drill & Machine Co., New Bedford, Mass.



JACK J. CARLSON, appointed vice president, Kaiser Steel Corp., Oakland, Calif.



EDMUND L. FITCH, named manager, sales promotion, The Howe Scale Co. Inc., Rutland, Vt.



FRED O. HOSTERMAN, appointed vice president, sales, Weston Hydraulics, Ltd., N. Hollywood, Calif.; **Harvey F. Gerwig**, appointed vice president, engineering.



DANIEL J. GIRARDI, appointed metallurgical engineer, Research & Process Control, The Timken Roller Bearing Co., Canton, Ohio.

The Iron Age INTRODUCES

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F. B. Patton, elected vice president, Armour & Co., Chicago.

Louis E. Dondero, named manager, Rock Drill plant, Le Roi Div., Westinghouse Air Brake Co., Cleveland.

Albert H. Stender, named assistant manager, tabulating dept., Wheeling Steel Corp., W. Va.

Robert C. Cheek, named manager, industrial electronics dept., Westinghouse Electric Corp., Meadville, Pa.; **Chris J. Witting**, appointed general manager, consumer products, Pittsburgh.

A. B. Fisher, Jr., appointed assistant manager, production, Engineering & Construction Div., Koppers Co. Inc., Pittsburgh; **R. K. Matthews** and **H. F. Welch**, appointed general superintendent of construction; **R. D. Segur**, appointed byproduct & chemical superintendent, operating dept.

Torben Humle, named plant manager, Inland Steel Container Co., Jersey City.

George A. Jedenoff, appointed general superintendent, Pittsburgh Works, Columbia - Geneva Div., U. S. Steel Corp., Pittsburgh, Calif.; **R. L. Dowell**, appointed assistant general superintendent; **E. C. Kinyon**, appointed superintendent, sheet finishing; **J. P. Newman**, appointed superintendent, cold reduction; **E. L. Slagle**, appointed superintendent, wire & wire products; **W. W. Tryon**, appointed works industrial engineer.

Edmund L. Fitch, named manager, sales promotion, The Howe Scale Co. Inc., Rutland, Vt.

Fred O. Hosterman, appointed vice president, sales, Weston Hydraulics, Ltd., N. Hollywood, Calif.; **Harvey F. Gerwig**, appointed vice president, engineering.

Charles R. Sigler, appointed manager, engineering, Kawneer Co., Niles, Michigan; **B. W. Larsen**, appointed manager, production engineering; **Charles L. Grosdeck**, appointed manager, production; **James F. Ryan**, named plant manager, Lexington plant; **John M. Edwards**, appointed manager, procurement, Lexington plant.

Kenneth L. Snover, appointed assistant vice president, manufacturing, IBM Corp., New York; **J. J. Black**, appointed assistant controller.

George Bastian, named industry manager, metalworking accounts, **The Twin Disc Clutch Co.**, Racine, Wis.; **G. W. Upp**, appointed industry manager, crane & shovel accounts; **P. G. Tyrrel**, appointed industry manager, rubber tired vehicle accounts; **R. C. McRoberts**, named industry manager, engine accounts.

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Frank K. Donnelly, named sales representative, **Torit Manufacturing Co.**, St. Paul, Minn.

Ransom B. De Lisle, named purchasing agent, **Niagara Machine & Tool Works**, Buffalo, New York.

Donald W. Games, appointed sales engineer, **Production Machinery Co.**, Mentor, Ohio.

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Clifford W. Briggs, appointed manager, production control, **Brackinridge Plant**, **Allegheny Ludlum Steel Corp.**, Pittsburgh; **Charles G. Hathaway**, named manager, customer service.

Ray J. Fellows, appointed sales manager, **Wisconsin Motor Corp.**, Milwaukee.

Robert W. Wyman, appointed manager, **Kaiser Aluminum & Chemical Sales, Inc.**, Youngstown, O.; **Robert J. P. Jensen**, appointed manager, Boston.

John C. Terry, Jr., appointed chief engineer, **Machine Products Corp.**, Detroit.



J. WILLIAM KELLY, appointed sales manager, electric truck section, Industrial Truck Div., **Clark Equipment Co.**, Battle Creek, Mich.



ROBERT D. BROWN, named assistant secretary, assistant treasurer, **Farbanks Morse & Co.**, Chicago.



PAUL C. FORD, appointed chief engineer, Electrical Div., **Wagner Electric Corp.**, St. Louis.



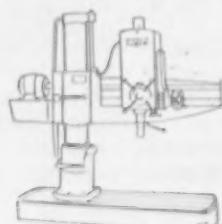
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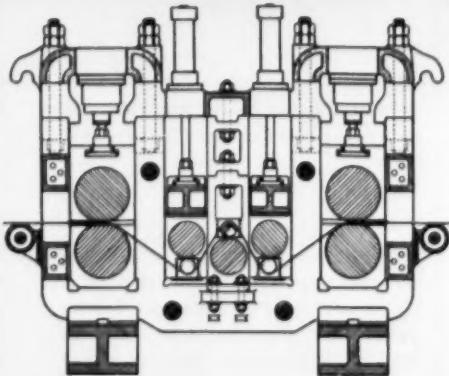


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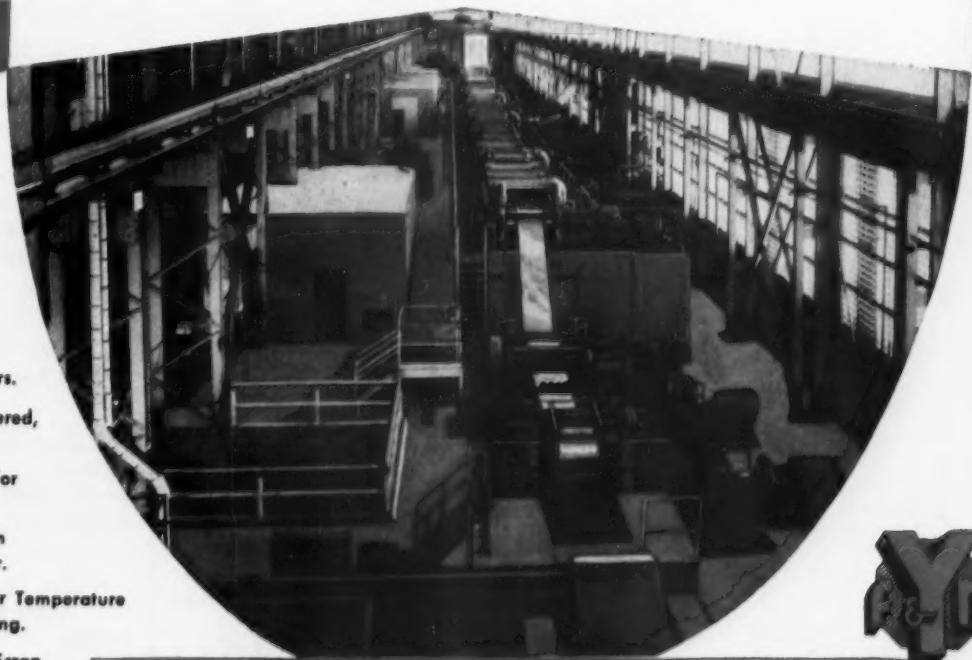
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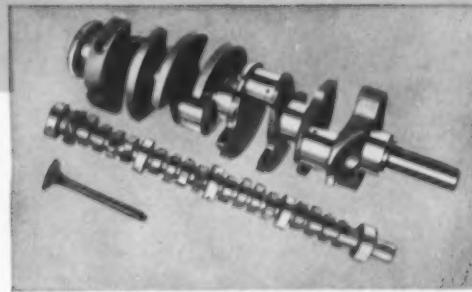
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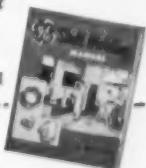
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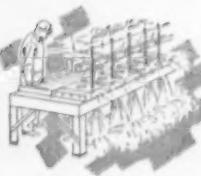
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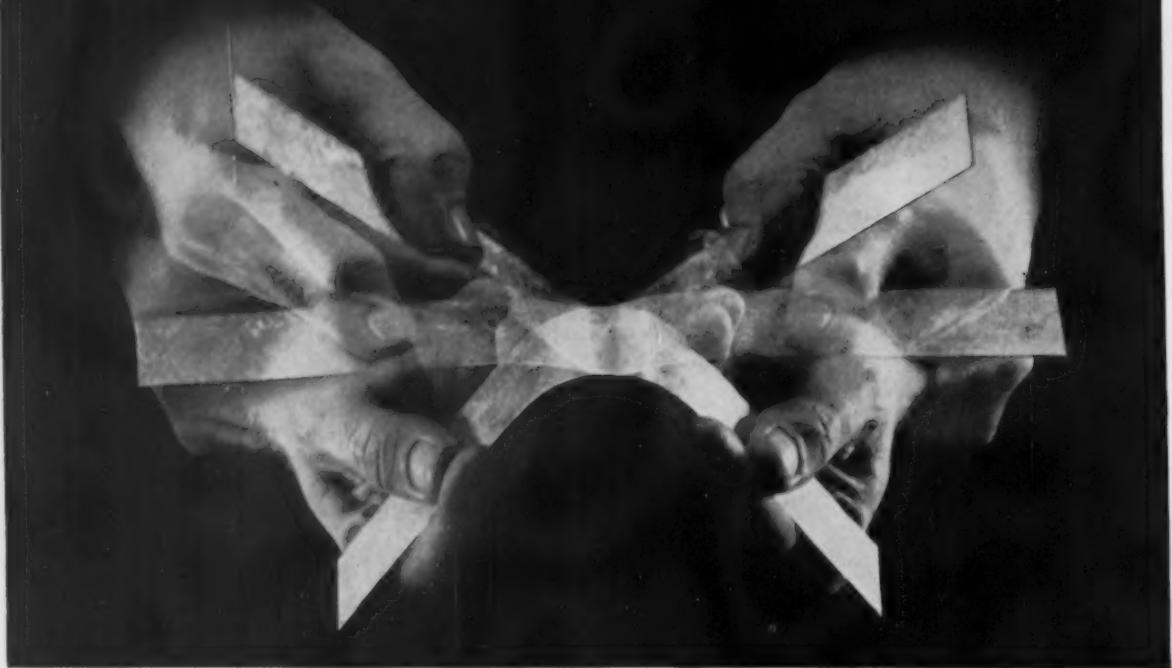
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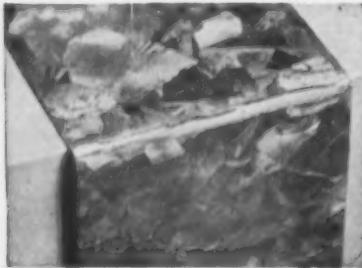
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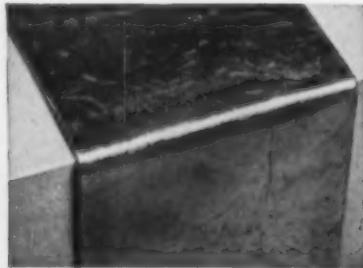


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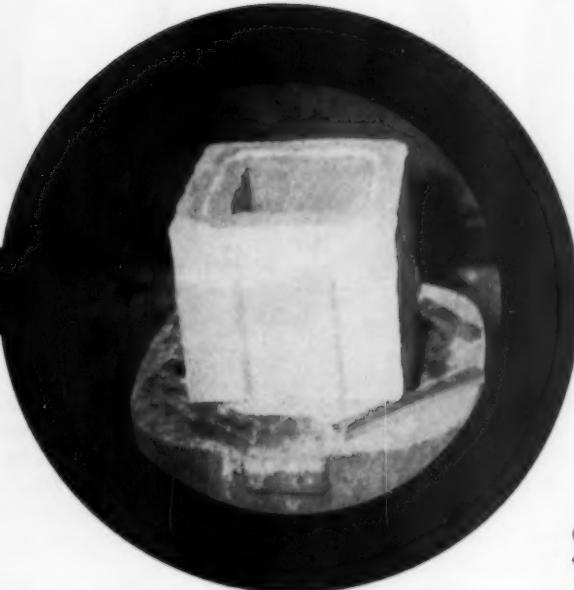
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New Hot Tops Save Metal, Make Sounder Ingots

By H. D. SHEPARD, Metallurgist, Foundry Services, Inc., Columbus, O.

♦ A new, exothermic material for hot top lining produces a sounder ingot and reduces feed metal losses to a minimum . . . Metal savings frequently exceed 10 pct.

♦ The new material can be used as a lining for conventional clay or cast iron hot top molds . . . Or—because it is moldable—it can be formed into a sleeve for direct feeding to the ingot mold.

♦ PRODUCING SOUND INGOT with a minimum of feed metal in the hot top portion has been a longtime challenge to steel producers everywhere. Perhaps the most ingenious solution yet presented involves the use of a new moldable, exothermic material for hot top lining. This new lining material not only reduces metal loss drastically but also contributes to the production of sounder, more forgeable ingots.

Average hot top metal loss is in the range of 12 to 16 pct, despite the fact that only 1 to 3 pct of the feed metal forms an actual part of the ingot. The remainder is lost in required cropping. A hot top lined with the new exothermic material can reduce all such head metal losses to as little as 4 pct.

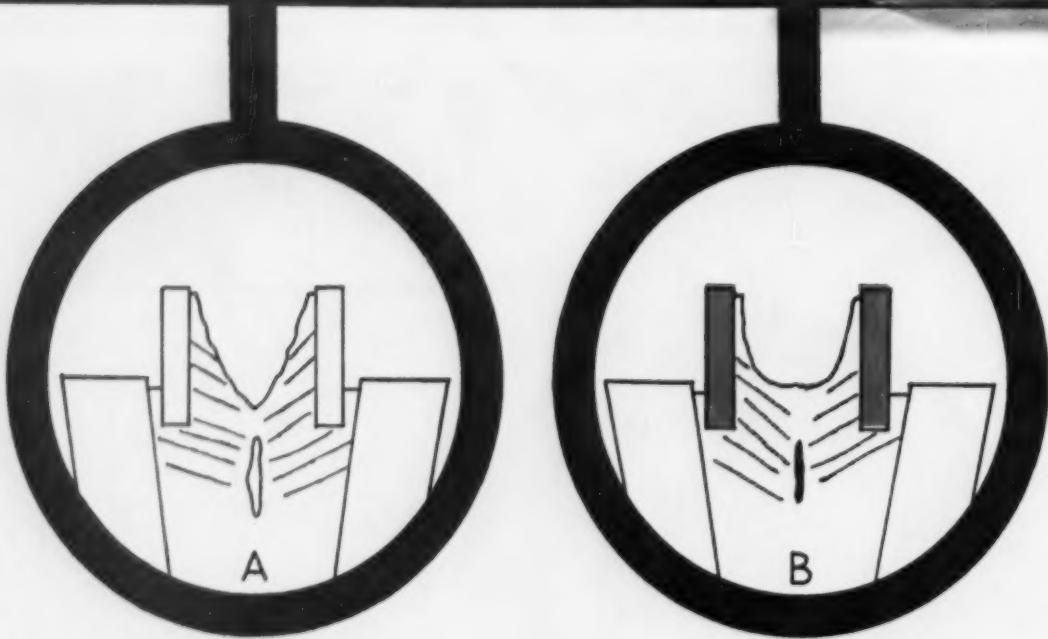
The new material can be used to line con-

vventional clay or cast iron hot top molds. Or—since it contains a water-soluble binder—it can be molded in the form of a sleeve and inserted directly into the top of an ingot mold.

Produced by Foundry Services, Inc., Columbus, O., the material was developed at the Research Center of Foseco, Birmingham, England. It is available as a powder or in the form of prelined hot tops. The latter are being made under a license arrangement at the Eureka Firebrick Works, Mt. Braddock, Pa. All of the products are marketed under the trade name Foseco Feedex.

Despite its newness, the Feedex hot top has been tried and proven in the actual production of ingot ranging from 4 to 20½ in. square.

Application of the new lining is not limited to particular alloy compositions. To date, it



has provided equally satisfactory results with tool steels, most of the commercial stainless grades, and a variety of the more popular structural types, including 1020, 1040, 4340, 8620, and 52100.

The lining mixture consists basically of aluminum chips or powder and a combination of chemical compounds capable of releasing free oxygen to ignite, and consequently oxidize, the aluminum. The powder is mixed with water.

A binder is contained in the mix to make it moldable. This binder develops in contact with water, and the resultant mix can be rammed or formed very much like common core materials to almost any shape or size.

When the material hardens, it becomes tough and strong. Its dry compressive strength is about 400 psi. In tests run to date, there has

been not one problem of erosion or chipping.

The hardened mixture ignites at temperatures above 450°F. At this point, an exothermic reaction occurs. The mix does not disintegrate but burns to form a solid, extremely hot refractory. Residual temperature is about 3500°F.

The heated refractory produced by exothermic reaction has very high insulating values. When it is in contact with molten metal, it retains its high heat for long periods of time. It is this particular quality that makes the new lining material especially unique.

Because the heated refractory is hotter than the metal it surrounds, the metal can not solidify on the walls of the hot top during the period required for ingot solidification. Consequently, the metal feeds from the hot top



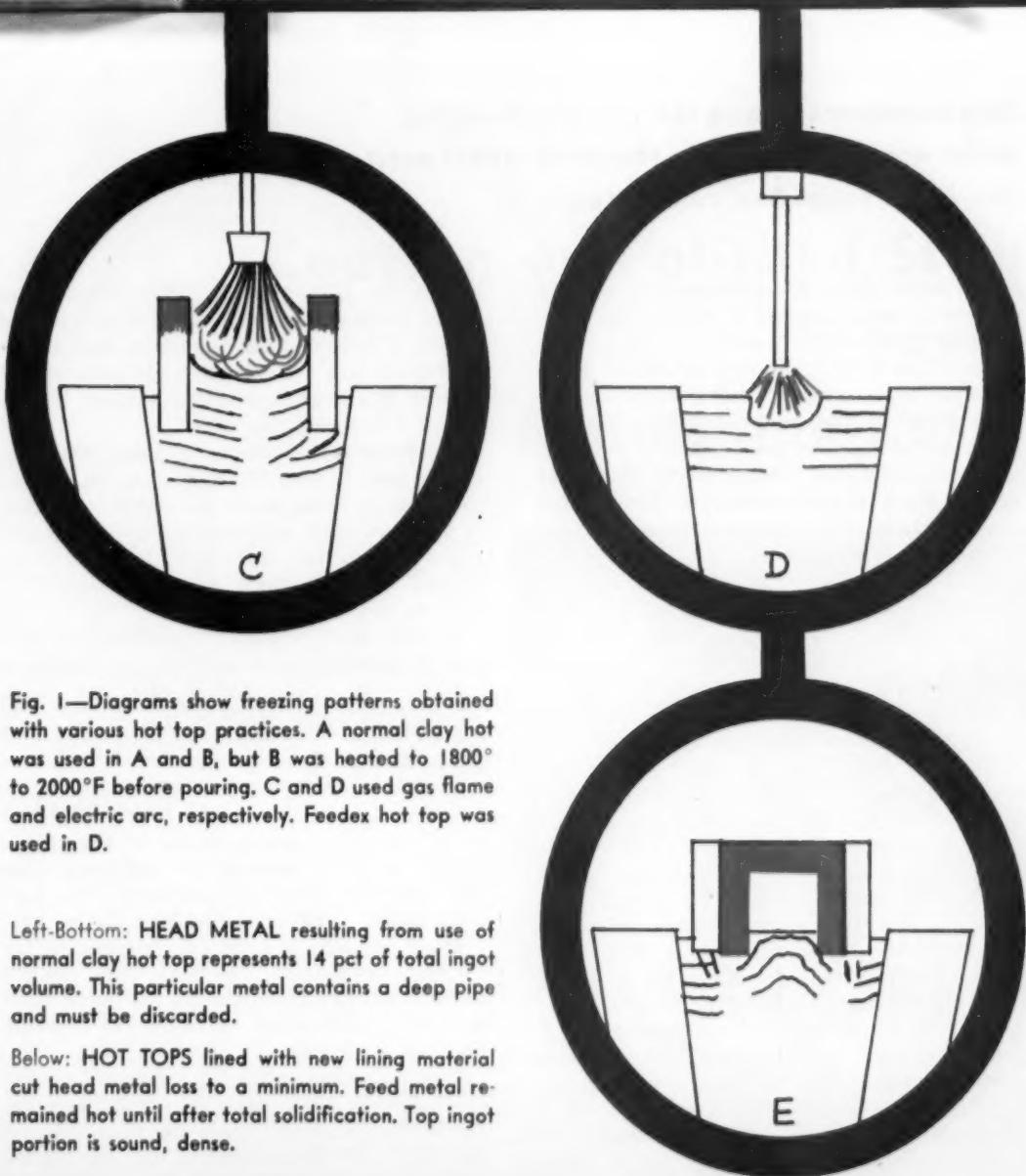


Fig. 1—Diagrams show freezing patterns obtained with various hot top practices. A normal clay hot was used in A and B, but B was heated to 1800° to 2000°F before pouring. C and D used gas flame and electric arc, respectively. Feedex hot top was used in D.

Left-Bottom: **HEAD METAL** resulting from use of normal clay hot top represents 14 pct of total ingot volume. This particular metal contains a deep pipe and must be discarded.

Below: **HOT TOPS** lined with new lining material cut head metal loss to a minimum. Feed metal remained hot until after total solidification. Top ingot portion is sound, dense.



Temperatures above the metal's freezing point are maintained in the head metal until after the ingot solidifies completely . . .

to the ingot. After solidification, only a small, flat butt of metal remains in the hot top.

Actual production experience on a wide range of steel analyses has served to determine the liquid volume of metal needed to feed ingot sizes up to 20½ in. square. Any size ingot can be fed into these specially lined hot tops with a resultant hot top volume that never exceeds 8 pct. Hot top volumes as low as 4 pct are a common production occurrence on ingot sizes of 20 in. square or less.

When the newly lined hot tops are first tested to establish a production procedure, it is general practice to start with hot top metal volumes of about 8 pct. Metal volume is then cut back gradually to the safest low limit.

With each 2 pct reduction in volume from the initial 8 pct, a 25 pct saving in metal is realized. Consequently, the lowest hot top volume capable of producing an acceptably sound ingot is always the ultimate objective.

The metallurgical aspects of using the new hot top lining material are highly significant. The material, unlike a number of common exothermics, produces no metal either during or subsequent to exothermic reaction. Since only a heated refractory is produced, there are no contaminants released to the molten steel.

With the wide variety of steels tested on a production basis, no depletion of alloying elements or reduction of carbon content was observed. This condition was carefully checked by chemically analyzing the head metal after solidification in the actual hot top. In every instance, head metal checked very closely with normal ladle analysis.

Freeze patterns vital

The solidification pattern obtained as a result of the specially lined hot top is extremely important metallurgically. Consider, for example, the freezing pattern of an ingot topped with a standard clay hot top. Because the clay is colder than the metal coming from the ladle, instant freezing occurs along the clay walls. The dissipation of heat causes rapid freezing toward the center. As a result, the metal is forced to feed through a hole that grows progressively smaller as solidification proceeds.

Shown in Fig. 1A is a solidification pattern typical of this condition. A V-shaped pattern forms from the upper walls of the hot top. The resultant shrinkage creates voids such as that shown directly below the base of the V. Serious segregation follows along the center line portion of the top of the ingot.

But let us assume that a clay hot top is pre-

heated to 1800°-2000°F. This temperature range is still lower than that of the poured metal. A freezing pattern such as that shown in Fig. 1B is a typical result. In general, the pattern is a slightly modified version of that obtained in a cold clay mold.

Gas-flame topping helps to some extent, as can be seen in Fig. 1C. But since the heat of the flame is pretty much restricted to the top of the head metal, solidification again proceeds along the relatively cold walls. A second modification of the V pattern is the net result after total solidification.

Further modification of the same basic pattern is obtained when electric-arc topping is used in connection with a cast iron mold. Again, freezing proceeds rather rapidly from the mold wall. The typical freezing pattern is shown in Fig. 1D.

Heads cool last

The freezing pattern shown in Fig. 1E is typical of those obtained in hot tops lined with the new exothermic material. The high temperature (3500°F) resulting from exothermic reaction is primarily responsible for the improved pattern. The liquid metal can not possibly solidify along the hot top walls until the walls have cooled to below the freezing point of the metal.

The refractory material produced by the exothermic reaction has good insulating properties. Temperatures above the metal's freezing point are maintained in the head until after the ingot solidifies completely. Contrary to conventional results, solidification in the head is initiated by the cooling effect of the ingot body. From the metallurgical standpoint, this represents the ideal condition.

The top of the head is also covered with a compound known as Foseco Ferrux 101. It provides sufficient insulation to minimize heat loss to the surrounding atmosphere.

The new hot topping procedure contributes to steelmaking in several ways. For one, it makes possible ingot to billet yields of 90 pct or more. It guarantees an increased number of ingots for each heat of metal poured. Both advantages are realized along with improved metallurgical quality.

Optimum freezing pattern reduces segregation and improves soundness in the top portion of the ingot. Results obtained from ingot to ingot are highly consistent. As a result, forging and rolling results are improved. Costs are shaved with each of these improvements, especially with gains in usable ingot metal.

Coating on Polished Strip Saves Refinishing Costs

♦ Flat-polished stainless strip coated with a resin-like film is formed into automotive trim parts that need 80 pct less refinishing than formerly . . . Net effect is doubled production.

♦ Spray coating is applied to the strip before it is roll-formed or stamped . . . Process eliminates the need for specially-padded racks to hold workpieces . . . The thin coating film can be removed easily with alkali cleaners.

By W. G. PATTON, Engineering Editor

COATING is used in conjunction with a special die lubricant for best results in stamping.

♦ A SPRAY-ON protective coating, applied to metal strip before it is fabricated into automotive parts, has cut refinishing costs about 80 pct on trim components produced at Chrysler Corp.'s 8-Mile Road plant, Detroit. The tough, flexible coating is sprayed on immediately after a series of in-line buffers have produced a highly polished surface on the strip metal.

Thus protected, the strip is fabricated either by stamping or roll-forming. Chief advantage of the coating is that it prevents the buffed surface from becoming marred or discolored either during the forming operations, or as a result of the handling that the workpieces undergo.

Net result is that the need for time-consuming final buffing on irregularly-shaped completed parts is greatly reduced. Moreover,



once the protective film has served its purpose, it can be removed easily with commercial alkali cleaners.

The coating material, known as Mar Proof, is a product of the H. A. Montgomery Co., Detroit. As applied in the form of a 0.0001-in. thick, quick-drying film, it does not protect the polished metal surface against gouging. But it does eliminate the need for specially-padded racks to handle the work. Therefore, regular tote boxes can be used.

There are several other advantages resulting from the use of the coating product, including—

1. Increased production. Total output of parts has been more than doubled without increasing other capital investment.
2. Faster buffing and greater ease of handling during processing.



STAMPING made from coated strip no longer requires a rebuffing after it has been formed.

3. Greater uniformity of product color and appearance, together with freedom from streaks.
4. Substantial improvement in die life.
5. Up to 90 pct reduction in die maintenance for some operations.

Optimum results in stamping operations are achieved by using the protective coating in conjunction with a special die lubricant. Where this combination is properly used with clean metal blanks there is no problem in keeping dies clean and free from buildup.

Lengthens die life

A test on one stamping showed that it had formerly been necessary to stone the dies after every two-hour production period. But with the special lubricant, the same dies produce 3200 stainless steel panels in an 8-hour period without any time out being required to stone the dies.

Chrysler process engineers point out that certain limitations must be recognized if the use of a protective coating prior to part-forming is to be successful. While the coatings are relatively hard, they will not resist gouging. Also, it is not possible to protect the work-piece if serious defects have worn in the die.

Furthermore, if a considerable amount of elongation occurs during forming, the thin protective coating may break. However, this does not eliminate fairly-deep drawn parts from consideration if the metal is relatively free to move during the forming operation. The limitation, therefore, applies to the amount of elongation—not to how deep the draw is.

A minimum investment of \$10,000 is necessary for a plant to set up to use Mar Proof. Any additional cost will be determined by the firm's production rate, automatic processing features and other factors.

While the coating can be completely removed easily by using a proper solution, it cannot be taken off by the usual degreasing methods.

Standard alkali cleaners at 170°F will remove a coating in less than a minute, and this may be accomplished either by dipping or spraying. Also, coatings are frequently removed during buffing or polishing operations. This can be done without undesirable wheel loading if proper buffing or polishing compounds are used.

The coating is also helpful in preserving color uniformity in stainless steel stampings. One such Chrysler part formerly required considerable buffing after stamping to restore its color and to remove small marks made by the die. After switching to the coating treatment combined with a suitable die lubricant, the cleanup buffing operation on the part was discontinued.

Where other parts were once polished after forming, it was often necessary to remove swirls and stop-off points by additional buffing. Frequently this produced undesirable variation in finish due to the use of different buffing

TABLE I

Specific gravity	1.03 at 20°C
Weight per gal	8.6 lb
Viscosity	3 to 5 cps at 20°C
pH	10.2
Odor	Slightly ammoniacal
Toxicity	Non toxic
Diluent	Water
Coverage	2000 to 2500 sq ft per gal
Inflammability	Not inflammable except under extreme conditions

machines or operators. Now these problems have also been eliminated.

The coating itself is an aqueous dispersion of synthetic and natural polymeric compounds. It can be used on a number of metallic surfaces, including stainless steel, low carbon steel and nonferrous metals. The formula is modified somewhat when the coating is to be applied to copper or aluminum. Specifications for the coating used at Chrysler are listed in Table I.

Normally, the coating is applied to only one side of the metal. By itself it is not a lubricant so that a secondary product of this type is desirable where stamping operations are involved.

At the present time, Chrysler uses the flat polishing and protective coating technique on strip material used to make stamped parts up to 2 in. wide. Maximum width of roll-formed sections made from polished and coated strip is 3 in.

Use tandem buffing

Certain preliminaries are part of a typical coating operation on strip that is to be roll formed. Stainless stock is fed off a payoff reel into a series of buffering heads. Normally, from 8 to 11 heads are used to generate a progressively finer finish. Standard wheels and buffering compounds are specified.

After moving through the buffering wheels, the strip is spray-coated on the top side only. Rate of coating ranges between 30 and 50 fpm. Residual heat generated during buffering is sufficient to dry the coating in a few seconds. Maximum drying temperature recommended is 250°F.

Immediately after it is coated, the moving strip is cut to length and falls into a tote box.

After the coating hardens over night, the stainless steel sections are formed in bending arbors and draw dies.

The procedure for stamped stainless steel parts is similar except that a special die lubricant is used. After coming off the payoff reel, the continuous moving strip is buffed in a series of 8 to 11 wheels. The strip is heated to 250°F in a chamber prior to applying the protective coating in a spray booth. Next, the lubricant is sprayed on, and the strip is then cut to lengths which fall into a tote box.

The coated and lubricated strip sections are then stacked and delivered to the press operators. Some stampings may be handled through two or more presses before operations are concluded.

Normally, the coating does not interfere with either butt welding or spot welding. However, some difficulty has been experienced in attempts at projection welding.

No special equipment is required to apply the protective coating. A spray booth large enough to permit carrying off the excess without accumulation is all that is necessary. Standard guns and liquid storage containers are used. The guns may be manually operated or they may be set to operate in time with the processing line. Although the coating solution is not inflammable it is recommended that the spray be exhausted directly into the outside air. Chrysler uses paint pressure pots having 10 to 15 gal capacity.

The coated products can be stored for an indefinite period without loss of protection. There is no indication that the coating induces any metallurgical effects. Colored coating is available and may be used in starting a new job. A blue coloring permits close temperature control of the operation.



PROTECTIVE film applied before forming eliminates 80 pct of rebuffering on these trim parts.



COATED lengths of strip can be handled in regular tote boxes, do not require special racks.

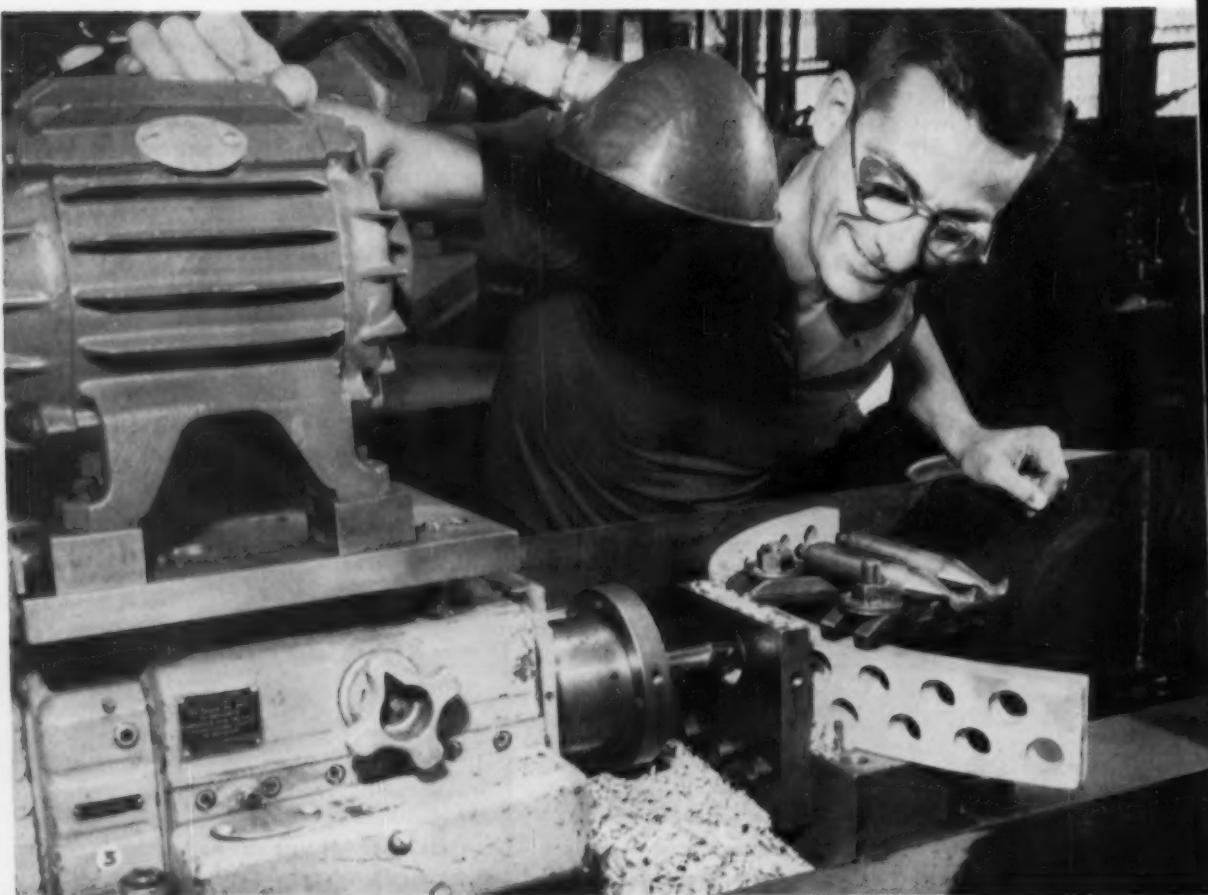
Design is key—

Cutting Costs on Tool and Die Repairs

- ♦ Good tooling, designed with probable future maintenance in mind, is the key to low-cost tool and die repair . . . you might pay a bit more, but downtime for repairs on poor tooling is often far more costly.
- ♦ Good housekeeping and safe practices help speed repair jobs through the toolroom . . . Use of mist coolant, jigs and fixtures and standard components also helps minimize repair time and expense.

By R. F. THUMA, Superintendent,
Tools and Maintenance Dept.,
Allis-Chalmers Mfg. Co., West Allis, Wis.

SPECIAL machine helps minimize repair costs by checking resharpened cutters for accuracy.



♦ **TOOL AND DIE** repair should really begin at that point where the designer starts to put lines on drafting paper. Tools that are properly designed to suit specific production requirements, and with future maintenance in mind, can greatly reduce the time and expense that will eventually be devoted to their upkeep and repair.

Although everyone is interested in the manufacture of adequate tools at minimum cost, it often pays to spend a bit more initially. The benefits to be gained both in the reduced maintenance cost and increased production should be obvious. Even a short period of downtime on a production line may be many times more expensive than the additional cost of providing better tooling originally.

Such small items as hardened clamps and locators, alloy steel studs, hardened nuts, and replaceable hardened inserts may be a good investment on fixtures and dies.

Aside from basic tool design, adequate storage facilities can be an important factor in reducing repair and maintenance costs. Protection from the weather is a must, since deterioration from exposure is a frequent reason why tools must be reconditioned. Use of a good protective coating is beneficial in many cases. And it may be worthwhile to store precision tools in specifically-prepared boxes.

Orderly storage is important also, to prevent or reduce damage caused by mishandling tools and dies that are simply stacked in various piles and places. Moreover, an orderly storage plan usually implies a good record keeping system for quick location of items that are usually needed in a hurry.

Another factor that can help minimize repair costs is adequate planning for advance notice that certain tools will be needed. The system must also insure that this notice will trigger a tool inspection well ahead of actual use. Waiting until the last minute to find out that repairs are needed often (1) upsets toolroom schedules with a "rush repair" job, (2) causes much additional paperwork and expediting, (3) frequently delays plant production.

New tools may cost less

Last-minute inspection can also result in making repairs to a tool or fixture that should really be replaced. And it might cost as much or more to make the repair as it would to make a new tool. This is especially true if the tool is old enough so that a modern, redesigned replacement would mean important savings in production time. Net result of this shortsightedness can be a double loss: First, throwing money away in repairing an old fixture; second, losing the savings that could be achieved with a well designed replacement.

Seemingly, the best solution would be to repair all tooling after it is used and before it is stored away. But there is always the consideration that some of it may never be needed again and therefore it would be an unnecessary expense to inspect and repair these items.

A large toolroom, equipped to manufacture and maintain a wide range of tools and fixtures, may have a large percentage of its personnel working on repairs from time to time. For this reason, a well organized system for scheduling work through the department can be important to overall production economy. Naturally, the system should be flexible and practical enough to accommodate the inevitable "emergency" repairs.

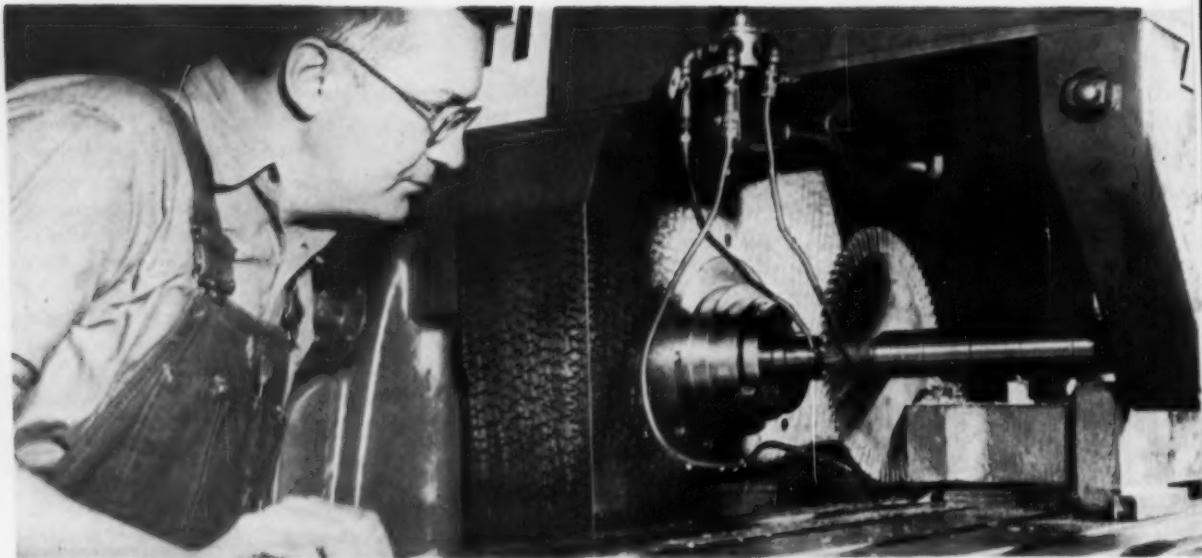
At Allis-Chalmers, all tools coming to the toolroom for repair go first to a receiving area. There they are recorded and inspected to determine the extent of repairs they require.

EDITOR'S NOTE

Based on a talk presented at the University of Wisconsin's Tool Engineering Institute, September, 1955.

SPECIALLY-tooled planer type milling machine does six operations on compressor rotors.





USE of mist coolant extends life of high speed steel and carbide-tipped slotting cutters.

Experience shows that it is best to have a foreman make this determination, since a fixture that is supposedly in for a minor repair often needs much more work than was anticipated.

Actually, the company often finds it necessary to route the tool to the inspection department for an exact determination of the full repair task. Occasionally this checkup leads to redesign and sometimes to complete replacement. In such cases the work is referred to the tool engineering department. However, if the inspection discloses that nothing more than routine repair or maintenance is required, the work is sent directly to the toolroom.

Still another practice that can reduce both the time and cost of tool and die repair is the use of standardized fixture components wherever possible. This should be largely the responsibility of the department that originates tool designs. The standardized parts can either be stock catalog items supplied by parts manufacturers, or they can be created by a firm's own tool engineers.

It is generally advisable to carry these standard items in stock for quick availability. But if this is not feasible, some manufacturer can usually be found who will set up to provide excellent service on such components.

In the actual process of making tool and die repairs, the methods used can be important to the cost element. Some repair groups are so used to doing these things by so-called toolroom methods that they overlook the time-saving possibility of using jigs and fixtures for their own work. These devices may not have to be as elaborate or fool proof as those used

on production machines because they will generally be handled by men of higher skill.

Such equipment can vary considerably—from standard or semi-standard gages to special fixtures for milling and grinding; and even to special machines that will try out production tools before they are sent to the proper department for full-scale use. Frequently such simple things as standard angle fixtures for repetitive work on cutter grinders will quickly pay for themselves in setup time saved.

Inspection pays

At Allis-Chalmers, all work done by the toolroom is inspected regardless of whether it is "new" or "repair." Work aids used by the inspection department include calibrating equipment. A separate section of this department is maintained entirely for inspection of cutters. Tooling errors detected and corrected in this department save the more costly time and expense of looking for trouble spots once the tool fails to work properly in production.

Because toolrooms are usually staffed with excellent and ingenious craftsmen, it is important that their talents be confined to legitimate tool and die building and repair. At one time, the Allis-Chalmers toolroom was literally flooded with small items such as pipe wrenches, pliers, paper staplers and other hand implements that were sent in for repair.

When the work load on such petty items reached a certain point, a checkup was made on the economics of the situation. It showed that it was cheaper to replace many of these small tools than to try to repair them. As a general rule, the tool room will tackle the re-

Seven Ways to Cut Tool and Die Repair Costs

- 1. Design tooling with easy maintenance in mind.**
- 2. Store tools neatly, in weather-proof areas.**
- 3. Inspect tools and dies well in advance of re-use.**
- 4. Use stock fixture components wherever possible.**
- 5. Speed up "toolroom techniques" with use of jigs and fixtures.**
- 6. Don't waste time repairing small, inexpensive items.**
- 7. Emphasize safety in work areas and worker habits.**

pair of any item that costs more than \$10. But a very close second look is taken at the advisability of repairing anything that originally cost less than this amount.

Although the subject may be a controversial one, the company finds that the use of mist coolant has a beneficial effect in reducing tool repair and replacement. The various production shops use more than 250 mist coolant units, generally of a permanent nature. The toolroom also applies this technique to many of its operations through the use of portable units moved from machine to machine.

Among the benefits the firm derives from its mist coolant installations are:

1. Increased tool life at the same speeds and feeds.
2. The same or improved tool life at increased feeds and speeds.
3. Possibility of using coolant where it would not normally be feasible; for example, on boring mills, slotters, grinders, lathes and other machines.
4. Elimination of the smoke that is often generated when cutting oils are used.
5. Better and safer working conditions, since there is practically no splashing and consequently less oil on floor and machine surfaces.
6. Better visibility at the cutting area; layout lines and punch marks are not covered with coolant so that it is easier to work to these marks.
7. Easier maintenance since oil sumps do not have to be cleaned.

The firm finds mist coolant very successful, for example, in slotting cast iron or steel with high speed steel or carbide tipped cutters. Cut-

ter life is doubled when steel sections are machined, and it is increased four times when cast iron is worked on.

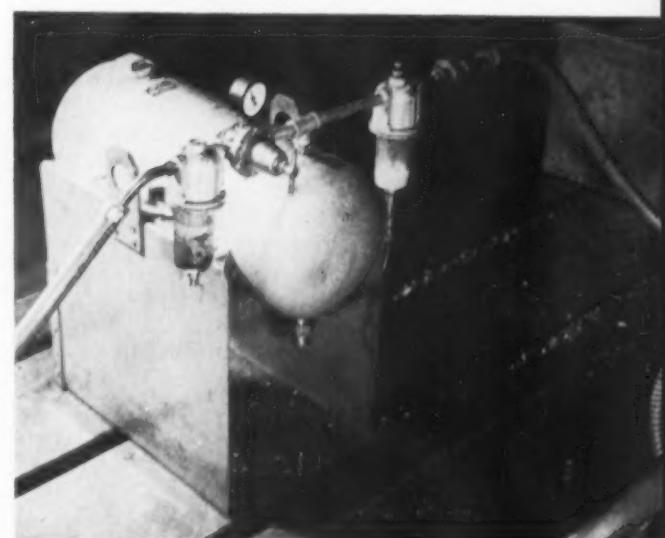
Generally, the company finds that mist coolant is not too successful in grinding operations. But an exception occurs in one case where a hob grinder is used to regrind high-spiral milling cutters. The large amount of stock to be removed formerly required that the job be "nursed" along to prevent burning, and it was frequently necessary to remove the work from the machine to let it cool off.

Presently, the use of mist coolant permits finishing the job without interruption. In this instance, at least two hours are saved in processing each milling cutter.

The firm also feels that emphasis on safety and safe operation is effective in any overall program to cut the time and expense involved in tool and die repair. Good housekeeping—properly marked areas and aisles for material and work in process—are credited with saving considerable time in the busy toolroom.

A goal of any conscientious manufacturer is to provide a safe place for employees to work. In addition to the humanitarian phase, when an experienced tool and die maker suffers a lost time accident it can have a serious effect on tightly scheduled repair and maintenance work.

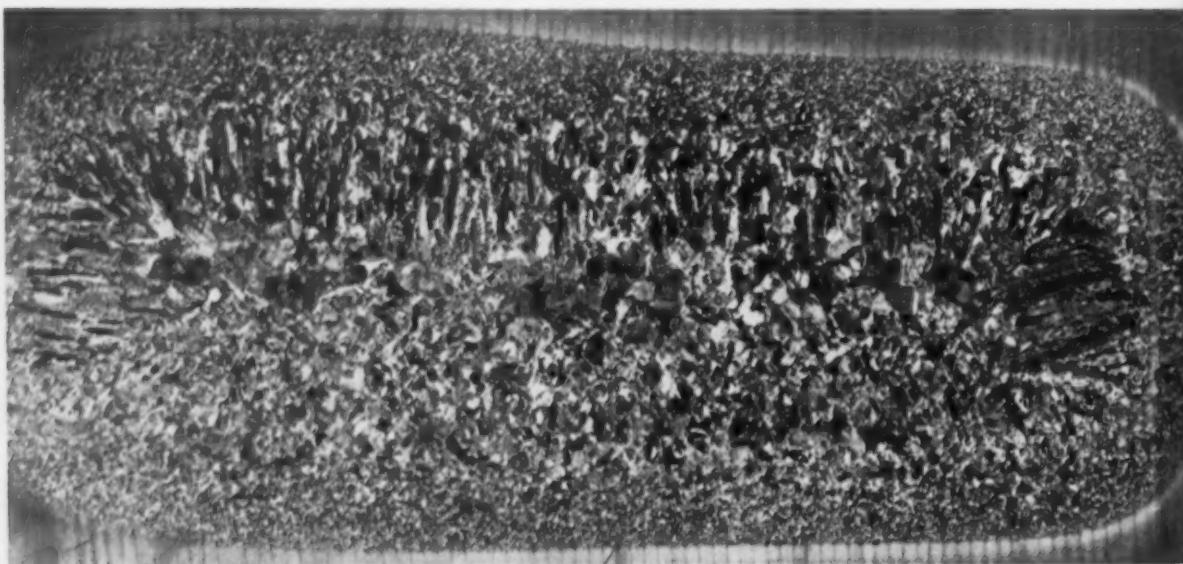
For this reason, Allis-Chalmers requires all employees to wear safety glasses, and side shields are a must on all grinding operations. The use of safety shoes is encouraged, and an average of about 80 pct of employees wear them. Safety posters and items are posted regularly in conspicuous places. In addition, each supervisor is required to talk informally to three employees every day about safety.



TOOLROOM efficiency improves when mist coolant unit can be moved close to the work. This unit is one of first built for portability.

Weld Titanium Sheet Leftovers

- Odd pieces of clean titanium sheet left over from fabricating operations need not be scrapped . . . They can be stacked and spotwelded to produce a small, machinable billet or nugget.
- The Glenn L. Martin Co. does just this to conserve costly titanium metal . . . Billets made this way are chained into pressure-resistant tube couplings for aircraft use.



SECTION of spotwelded laminate shows a cast structure in the fused central zone. 1.5 X

AN UNDERWATER spotwelding technique transforms leftover pieces of commercially pure titanium sheet into machinable billet-nuggets at The Glenn L. Martin Co., Baltimore. By fusing stacks of pieces remaining from sheet-fabricating operations, the company gets maximum usage from this costly material.

Soundness of the nuggets made in this manner is proved by the fact that they are presently being machined into couplings for high-pressure tubing systems in aircraft.

All titanium sheet leftovers of a like alloy, regardless of thickness, are first collected, then sheared or blanked to convenient size. They are then cleaned in a deoxidizing solution of 2 pct hydrofluoric acid and 10 pct nitric acid. Clean pieces are then stacked to a desired height up to 6 in. and spotwelded. This produces a solid, fused nugget at the center of the stack.

Welding is done in a 400 kva, 3-phase ma-

chine. Cycle time is 30 seconds, and a constant high pressure of 23,400 lb is maintained on the stack.

Depth, uniformity and quality of weld is accomplished by submerging both the welding electrodes and the work in a tank filled with circulating cold water. The water is supplied through the cooling system of the upper electrode.

Show high tensile strength

Metallurgical examinations and physical tests on the titanium nuggets produced by this process were made at Watertown Arsenal, and in Martin's own materials laboratory. Test bars machined from the columnar, fused nuggets were found to have an average ultimate tensile strength of 95,555 psi.

The zone in which complete fusion occurs shows a cast structure with a coarse beta grain matrix and alpha platelets. The alpha struc-

into Machinable Billets

By C. W. SHIPLEY,
Asst. Tooling Manager,
The Glenn L. Martin Co.,
Baltimore



THIS machinable billet-nugget remains after the unwelded pieces of sheet are broken away.

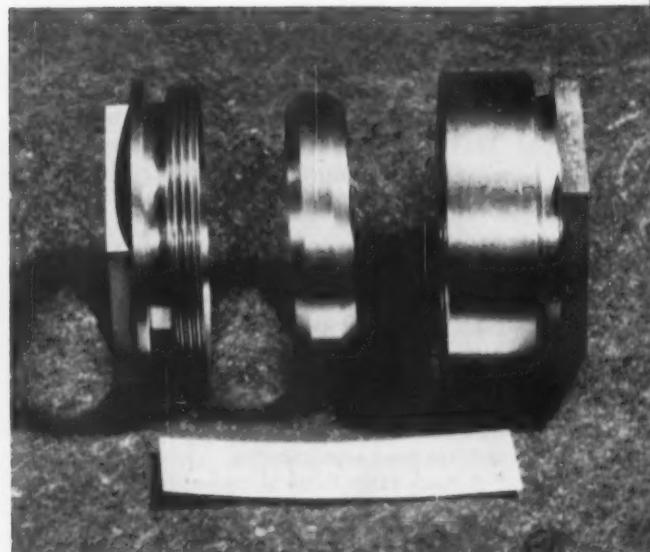
ture is completely melted during the welding process. As the nugget cools, crystal growth develops at or above the transformation temperature of 1625°F.

After welding, the unfused portions of the titanium sheets are broken away and the remaining nugget is easily machined—in this case into a dependable fuel line fitting.

Tests show that these 1½ and 2-in. diam fittings withstand pressures up to 900 psi. Their resistance to shattering has been demonstrated by lowering the temperature of the parts to —100°F and striking them repeatedly with a hammer. No apparent damage results.

It has also been determined that these titanium fittings perform best when they are used with titanium tubing.

Although this process is presently being applied solely to aircraft components, it offers possibilities for many other commercial items which are subject to corrosive attack.



Above: DUCT connector fittings are typical of those machined from spotwelded titanium billets.

Below: SPOTWELDING the stack of sheet pieces is done with work and electrodes under water.



With small steel parts—

Redesigned Line Halves Black Oxide Coating Costs

• Redesigned facilities for coating small steel parts with black oxide has speeded processing considerably . . . Work which formerly required about 80 hours now takes 16 hours.

• Processing parts in specially-built steel barrels gives them uniformity of color . . . Automatic control of solution level and concentration also keeps the operation within close limits.

By HERMAN GARDNER, Chief Chemist, Colson Corp., Elyria, O.

• OPERATING COSTS have been reduced more than 50 pct by redesign of a steel blackening line. Work formerly requiring about 80 hours now is finished in 16 hours. Uniformity of the black oxide film has been upgraded, so much so that an inspection station no longer is needed and has been eliminated.

A black oxide finish is preferred by the Colson Corp. for a number of reasons: 1) pleasing appearance, 2) resistance to flaking, 3) reduced friction, 4) dimensional trueness, 5) application economy and 6) corrosion resistance when treated with a rust-inhibiting oil or wax.

Blackening is accomplished by the niter proc-

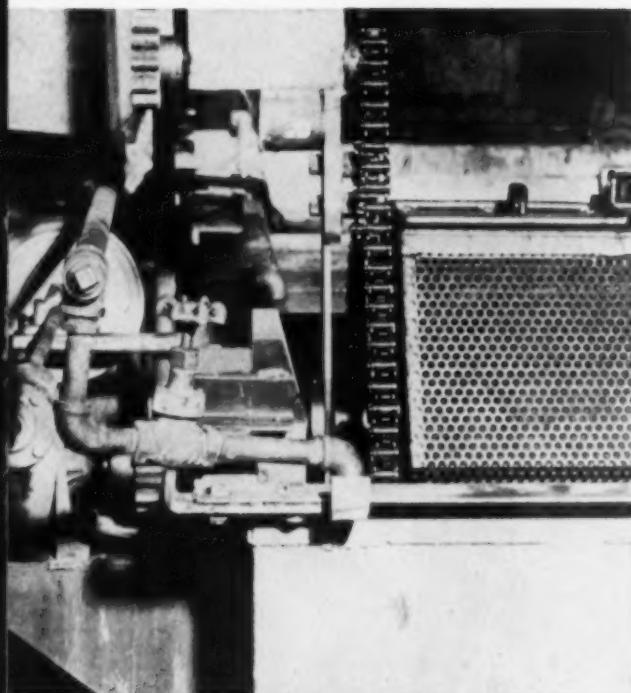
ess. A solution is used rather than a molten mixture of nitrates.

Previously the blackening operation was carried out by transferring baskets loaded with work from one tank to another. Neither the work nor the solution was agitated.

This procedure complicated the quality control job. If a basket was filled with too much work, uneven blackness resulted—necessitating retreatment. Also, salts accumulated in folds and recesses of parts, contributing to later corrosion. Excessive time, excessive costs both in labor and materials—all pointed to the need for more efficient operation.

HEXAGONAL steel barrel rotates at 2½ rpm, resulting in uniform blackening of parts.





HOIST lowers barrel to engage spur gear on hanger with rotating gear on tank lip.

A mass production line was designed similar to that used in plating operations. Steel tumbling barrels and separate steel processing tanks were installed. Future expansion of the line is a simple matter of increasing the number of barrels and tanks.

Temperatures of blackening solutions are controlled automatically by a bulk-type temperature-indicating controller. The controller also governs solution level and solution concentration within close limits.

The blackening solutions are heated by gas burners to boiling temperatures. As the solution evaporates, it becomes more concentrated and the boiling point rises above control temperature. This signals the temperature-sensing equipment, which operates through a relay to open a motorized water valve.

Tumbling agitates solution

Tumbling action of the barrel rapidly mixes incoming water with that already in the tank. When sufficient water has been added to bring the boiling point below control temperature, the controller signals and the valve is automatically closed.

In time, solution dragout removes part of the blackening chemicals. Before the solution level is sufficiently lowered to expose the top of the tumbling barrel, additional salts are added. After they dissolve, the boiling point rises rapidly. The automatic controller then acts to add sufficient water, bringing solution level back to normal.

Six unlined steel tanks 24 x 36 x 24 in. high hold the cleaning, rinsing and blackening solutions. Plastic lining is unneeded in this application, for steel is sufficiently resistant to the corrosive action of hot caustic.

Since it was difficult to obtain steel barrels suitable for this particular process, five barrels were designed and fabricated by the company. This was enough to insure continuous operation and take care of present production requirements.

Barrel hoist operated electrically

In operation, parts to be blackened are loaded into a tumbling barrel. After experimentation, seven-eighths of a barrel load rotating at 2½ rpm was found most efficient. A uniform film thickness is produced in minimum operating time, with no objectional nicks or rubs. The difficulty with salt deposits in folds and recesses has been eliminated.

An electric hoist picks up the barrel and lowers it into the first tank, which contains cleaner solution. A rotating spur gear on the tank rim engages the gear teeth on the barrel as it settles.

The solution contains two ounces of cleaner per gallon. Temperature is maintained at 180°F by steam coils. After tumbling for 10 minutes, the barrel is transferred to a 160°F water rinse.

Following a 5-minute tumbling rinse, parts are removed to a pretreat blackening solution. The 290°F solution holds about 7½ lb of blackening chemicals per gallon. Constant rotation throughout the ten minute pretreatment produces excellent coverage of all parts.

Solution in the main blackening tank is kept at a temperature of 305°F and a concentration of about 10 lb per gallon. Work is tumbled 10 minutes, then transferred to a 5-minute cold water rinse. The last step in the process is a 2 to 3 minute dip in a rust-inhibiting solution.

Each tumbling barrel is 27¾ in. long and 15 in. between hexagonal sides, to give a volume of 3.1 cu ft. Ends of the hexagonal barrel are closed by cut steel plates, ½ in. thick at one end and 1 in. thick at the other. The heavier plate balances the tumbling drive at the other end of the barrel.

The barrel is hung on heavy steel brackets from stub shafts. The shafts project beyond the hanger brackets to fit into channel guides welded to the tank lips. A lug is welded to the brackets and aligns the barrel as it is lowered into the channel guide.

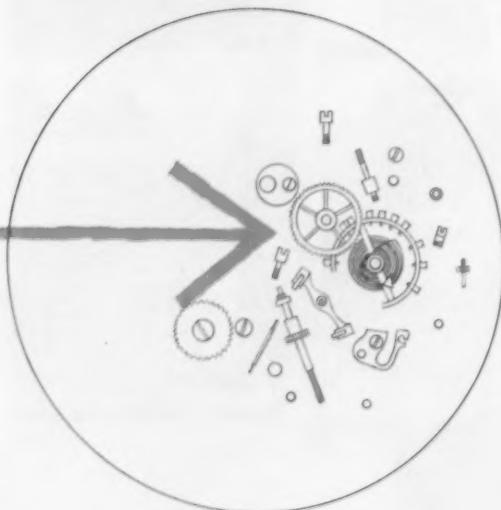
A spur gear, directly connected to a small sprocket, drives the barrel. A sprocket chain links the small drive sprocket with a larger sprocket bolted to the barrel. The spur gear shaft rides on a bronze bearing in a housing welded to one hanger bracket.

Channel guides carry the heavy weight of the barrel and its load, so are fabricated from cold-rolled steel plate. A bearing surface for the barrel shafts is provided by 2-in. pillow blocks bolted to the channel guides.

Use special concrete—

Dustless Floor

Cuts Down On Small Part Rejects



• CHOICE of production plant and warehouse flooring is not often considered of major importance in reducing manufacturing costs. But in metalworking plants producing precision parts, floor dust can be a serious and expensive problem.

Dust particles settling on the small precision parts absorb moisture, and become the nucleus of corrosion spots. In watch springs, feeler gauges and similar tiny parts, even the slightest blemish of corrosion means automatic rejection.

Once rejected, components often are a total loss. Tolerances may be exceeded in refinishing, or salvage is not economically feasible. In extreme cases, a high reject rate of completed parts may be attributed directly to dust resulting from erosion of poorly compacted and cured concrete floors.

Cured by absorption

One type of flooring material is increasing in industrial use because of its erosion-resistance and virtually dust-free surface. The material is a form of concrete, cured by an absorption process that closely controls the amount of moisture in the finished flooring.

In a recent application at Sandvik Steel, Inc., Fairlawn, N. J., the concrete was selected for 6500 sq ft of production and warehouse flooring, at the recommendation of the installers, Kalman Floor Co.

Sandvik manufactures specialty steels used in such diversified products as needles and sinkers for textile machinery, camera shutters,

watch springs and surgical knives. The firm also produces Swedish steel springs, some so small that 250 weigh only one ounce.

Company engineers found the absorption process concrete tough and wear-resistant. The floor dusting problem is now under control since the surface strongly withstands erosion. This erosion was previously caused by heavy truck travel and the grinding action of metal particles.

An absorption-process floor usually requires use of a hard rock aggregate of basaltic or granitic origin. Such a mix results in a fine-grained interlocking crystalline structure well-suited for industrial floors.

Absorption blankets cover the poured concrete to make sure exactly the right amount of water is left in the mix. If insufficient water is used, not all the cement particles will hydrate completely, resulting in a weak bond. Too much water generally causes the fines in the concrete to rise to the surface and destroys the uniform distribution necessary in a good floor and lowers concrete strength.

In practice, the concrete is poured with excess water to insure thorough hydration of the cement, resulting in dense mix. Then excess moisture is removed with absorption blankets and covered with a drying agent.

After 10 to 30 minutes, depending on atmospheric conditions, the absorption blankets are removed. At this point, the floor is hard enough to walk on. Power floating and mechanical troweling are used to compact the concrete still further.



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New Technical Literature:

Expanding mandrel

A new 4-page bulletin covers a new company line of expanding mandrels designed so they can be machined in place on the machine. Discussed are the design principle, outstanding features, applications and specifications for which special mandrels can be supplied. *Erickson Tool Co.*

For free copy circle No. 1 on postcard, p. 101

Automatic feeders

A representative line of the company's automatic feeder units is presented in a new catalog. Illustration and text is included on tumble hopper feed, automatic hopper feeds, transfer conveyor, bar feeder and elevating hopper feeds. *Feedall, Inc.*

For free copy circle No. 2 on postcard, p. 101

Plastics

Contributions to new plastics design, production costs and performance, are described in a new illustrated brochure. "The Plastics Story" (CDP-673) tells how molded plastics can aid in product development; it describes new automatic compression and injection molding facilities. The brochure pictures examples of present molded plastics applications—such as a molded nylon silverware holder for automatic dishwashers, and a redesigned lightning arrester, molded in G-E mycalex. *General Electric Co.*

For free copy circle No. 3 on postcard, p. 101

Epoxy resins

A bulletin describes two filled epoxy resins containing aluminum powder which have been developed for fulfilling mechanical requirements in casting, bonding and coating. They are recommended by the manufacturer for use in drop hammer die facings, wedge blocks, joggle fixtures, fixtures where aluminum color is desired and in parts where toughness is required. *Furane Plastics, Inc.*

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 101.

Plastic pumps

Complete operating and performance data on plastic pumps along with their materials of construction and recommended application tables are given in a new catalog. These pumps operate by means of a rotor mounted on an eccentric shaft creating a progressive squeegee action on the fluid. Since fluid is trapped between liner and body block, the proper selection of material for these parts makes the pump adaptable for wide use in corrosive solutions and abrasive slurries. *Vanton Pump & Equipment Co.*

For free copy circle No. 5 on postcard, p. 101

Motors and drives

"Motors and Drives for the Machine Tool Industry" is the title of a newly-issued brochure. Included are photos and information on many special and standard motors and adjustable speed drives. Descriptions and photographs provide essential data on 15 motors and drives, plus more than 19 supporting illustrations on installations and technical data on electrical features. *Louis Allis Co.*

For free copy circle No. 6 on postcard, p. 101

Tracer lathes

A folder describes a line of tracer lathes for one-setup machining of a broad range of complex shapes, including those requiring plunge or contour facing. Features of the lathes such as construction, maximum carbide utilization, chip chutes, automation and choice of drives are discussed in detail. *Hydra-Feed Machine Tool Corp.*

For free copy circle No. 7 on postcard, p. 101

Machining deep holes

New method for machining deep holes in solid metal or finishing cored holes in castings is described and pictured in a new booklet. This new drilling method, named Bor-Dril, is claimed to be faster, more flexible in application and more accurate than older methods. With work clamped in stationary fixture, one or more drills revolve at high speed. Metals recommended for machining by this method are common alloys, steel, cast iron, aluminum, bronze, brass, titanium and magnesium. Bulletin shows illustrations of machine in operation. *Ex-Cell-O Corp.*

For free copy circle No. 8 on postcard, p. 101

Gear checking machines

A new 16-page catalog describes gear checking machines and equipment. Discussed are universal gear checkers having five standard interchangeable measuring heads for checking various dimensions of external spur and helical gears including spacing, helix angle, wobble, eccentricity, size, parallelism, crown and lead. Internal spur and helical gear checkers, fully automatic gear checkers for gaging and sorting spur and helical gears, gear rolling fixtures and special checkers set up to make composite checks on all types of gears are also described. *National Broach & Machine Co.*

For free copy circle No. 9 on postcard, p. 101

Materials handling

A condensed catalog contains 50 pages of technical data, photographs and brief descriptions on vibratory equipment, feeders, conveyors, power tools, shaft seals, selenium rectifiers, diesel pile hammers, gasoline hammer drills, electric hammers and other materials handling equipment. *Syntron Co.*

For free copy circle No. 10 on postcard, p. 101

Strap clamping

A strap clamping principle reported to eliminate long, costly set-up sessions, insecure clamping and damage to work or work surfaces is described in a new folder. Illustrated are 12 complete strap clamp assemblies, each available in a number of sizes for every application. *Jergens Tool Specialty Co.*

For free copy circle No. 11 on postcard, p. 101



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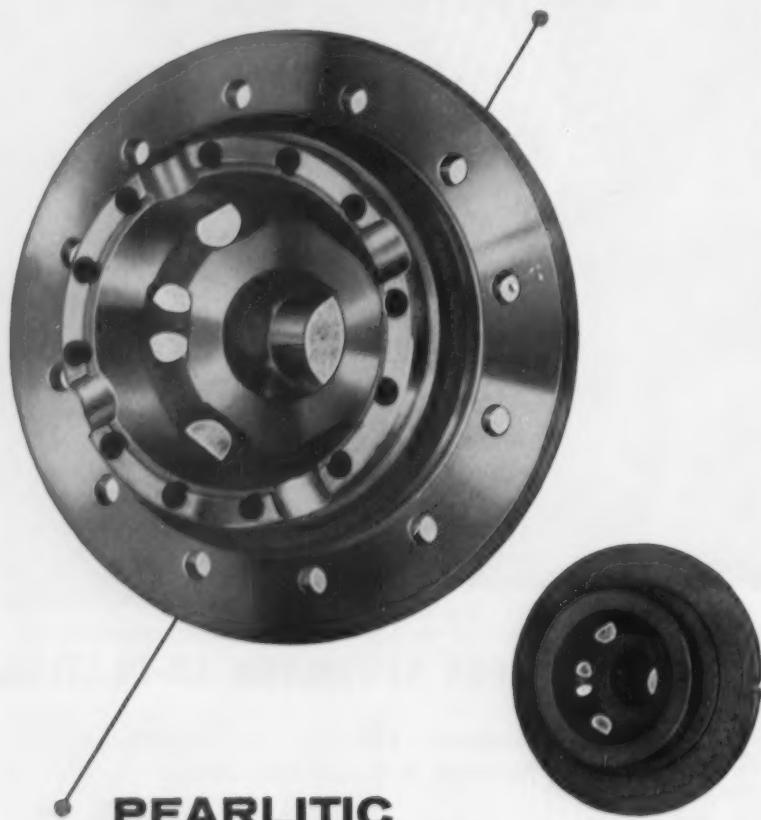
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Low machinability index of 80-90 (B1112 steel = 100) is probably reason enough to warrant serious consideration for your product.

But pearlitic malleable castings—from National—don't stop there. They have great ultimate strength . . . resist wear under heavy loads at high speeds . . . make excellent non-seizing bearings . . . can be air or liquid-quenched . . . can be smooth-finished.

Don't overlook the advantages of pearlitic malleable. For pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase the sales potential of your product.

AA-106

NATIONAL MALLEABLE AND STEEL **CASTINGS COMPANY**

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

Flowmeters

A new bulletin describes flowmeters featuring a direct flow design which uses a flexible vane to indicate flow on a calibrated scale. The design makes possible elimination of pivots, bearings, bellows, diaphragms, etc. The bulletin also describes other design features of the instruments. Application possibilities are analyzed for the Model "L" instrument which uses a direct reading scale and the Model "LP" which is fitted with a transparent cover to permit visual inspection of the liquid or gas flow. *Scully-Jones & Co.*

For free copy circle No. 12 on postcard, p. 101

Overhead tramrail

Engineering and application data on overhead tramrail is covered in a new booklet. It contains an analysis of stresses in a number of types of overhead tracks. Also discussed is track peening. Other sections describe and illustrate track switches, carriers, tractors, cranes, transfer cranes, gantry cranes, automatic handling systems, interlocks, discharge points, electrification, buckets and grabs. *Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.*

For free copy circle No. 13 on postcard, p. 101

Cutting oil

A transparent cutting oil, Sunicut 5534, is described in Technical Bulletin 39. Designed for use on a wide variety of steels, this non-emulsifying oil is said to reduce downtime in jobbing shops and in screw-machine shops where frequent changes of stock and operation are normal. *Sun Oil Co.*

For free copy circle No. 14 on postcard, p. 101

Water conditioning

A description of the steel cubicle method of installing instruments and electrical controls for a water conditioning plant is contained in a new bulletin. Discussed are typical assemblies of conventional and graphic type cubicles and a number of installations in various industries. Applications include power stations, metal recovery, municipalities, demineralization, electro plating, etc. *The Permutit Co.*

For free copy circle No. 15 on postcard, p. 101



It's too good
to keep!

"...you get quick cooperation
at Lamson & Sessions"

Yes sir, it's true . . . the cooperation you get when you work along with Lamson & Sessions is worth talking about.

Many people, with fastener problems, have found that "Service" and "Cooperation" are more than just words at Lamson.

When you bring a problem to Lamson & Sessions involving critical delivery dates, unique specifications, or fastener budget limitations, the folks at Lamson pitch in enthusiastically to solve the problem.

This "something extra" is the reason so many of our customers have said that they enjoy doing business with Lamson & Sessions. This same cooperation and attentive service is the difference between just-another-bolt-factory and the world's leading fastener manufacturer . . . Lamson & Sessions.

You, too can enjoy this difference.



Lamson
&
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YOU GET MORE WHEN YOU BUY FROM . . .

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CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO



Ostuco Welded Tubing

... Specified by men with responsibility



OSTUCO Welded Tubing offers design engineers unlimited latitude to create a variety of original but practical product designs.



Sales Managers can meet . . . and beat the competition with products incorporating OSTUCO Welded Tubing.



Cost Control is easier with OSTUCO Welded Tubing. Low initial cost and less time-consuming processing mean important savings.



Extra strength, less weight, and uniformity of OSTUCO tube walls insures top quality finished products time after time. No rejects here.



Production runs smoother . . . faster with OSTUCO Welded Tubing components. Assembly time is reduced, expensive operations eliminated. Production schedules are on time.



OSTUCO's single-source service design (manufacturing and fabricating under one roof) means error-free handling of every order—large or small. Purchasing can relax . . . less follow-up necessary with OSTUCO.



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SEAMLESS AND ELECTRIC WELDED STEEL TUBING
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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment
and services . . . they are free with no obligation . . . just
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This section starts on page 96

Corrosion resistance

A complete line of corrosion-resistant equipment is described in a new 32-page catalog. Featured and evaluated is equipment molded from polyvinyl chloride, epoxy glass and polyester glass, with data on resistance to chemicals and heat. Other information given includes: Data on Haveg cements for field servicing and mortars for brick and tile; descriptive advice on fitting Haveg pipe on the job; and a chemical resistance table for users of molded plastic equipment. *Haveg Corp.*

For free copy circle No. 16 on postcard

Test bars

A new booklet titled "How To Make Good Test Bars," covers the design and making of aluminum alloy and copper base test bars. Accompanying illustrations show recommended types of test bars. Melting and pouring procedures are emphasized as being of paramount importance in the production of acceptable test bars, with recommended temperatures, pouring procedures, and shake-out times listed for various alloys. *The George Sall Metals Co., Inc.*

For free copy circle No. 17 on postcard

Wire sling chart

A wall chart, 17 x 21 in., lists diameters and lifting capacities of Strand-Laid type wire rope slings. The chart—designed for display in industrial plants—is three-colored, metal edged and has eyelet for hanging. *American Chain and Cable Co.*

For free copy circle No. 18 on postcard

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 11/24/55

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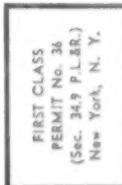
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State

Oil valves

A folder gives complete specifications on a series of oil valves for use in the ranges of 0 to 6000 psi. Included are 4-way, manipulator and shut-off valves in standard, tandem mounting and manifold porting types. *Barksdale Valves.*

For free copy circle No. 19 on postcard



Hole grinder

Accuracy, operating ease, grinding speeds from 4000 to 100,000 rpm, and construction features of the new 2E vertical hole grinder are contained in a 4-page bulletin. Discussed also are the unit's measuring system, grinding heads, depth indicator, dust collector, telescoping guards and centralized controls. *Pratt & Whitney Div., Niles-Bement-Pond Co.*

For free copy circle No. 20 on postcard



Pressure gage

A 4-page folder describes and gives specifications for pressure, vacuum, compound, pneumatic and electric transmitters, receiver, test and chemical protector gages. *Norden-Ketay Corp.*

For free copy circle No. 21 on postcard

FREE TECHNICAL LITERATURE

Hydraulic presses

A line of hydraulic presses is described and illustrated in a 4-page brochure. Discussed are: a 20-ton standard for blanking, forming, coining, shaving and drawing; a 20-ton special for tube bending; and presses for straightening and forcing. *Gibbons Machine Co.*

For free copy circle No. 23 on postcard

Infrared ovens

"Radiant Heat—Applications unlimited," is the title of a catalog discussing a company line of radiant ovens, their advantages, operating features and applications. The equipment is used for baking, drying, dehydrating, preheating and degreasing. Photographs and drawings are shown of the models in the line. *Fostoria Pressed Steel Corp.*

For free copy circle No. 24 on postcard

Electric controls

An improved line of micro switch trip controls—electric two-hand clutch controls for industrial machines—are featured in a new catalog. The booklet details how to convert manually operated machines to power operation. Complete control equipment shown includes control boxes, hand, foot, limit and lock-out switches, as well as clutch actuating equipment including electric solenoids, air cylinders, air valves and air-lube units. *Micro Switch Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 25 on postcard

Inclinable presses

A complete line of inclinable presses from 10 to 200 tons, and in both standard and enclosed design, is described in a new 32-page catalog. The catalog describes the complete line of presses, including special features and attachments available, and lists complete dimensions. There are special sections containing complete information on the company's line of clutches, automatic feeds, and die cushions. Another section describes such design features as single vee gibbing, counterbalances, lubrication, and connections. *E. W. Bliss Co.*

For free copy circle No. 26 on postcard

FOR MORE LITERATURE

Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Controller

A new bulletin (F 5795-2), describes how the Wheelco Capaciline, a supplementary control device, anticipates the fuel needs of controlled heating equipment and enforces straight line control on the process variable. In this unit heat transfer lags are anticipated and effectively compensated for by means of a unique and simple electrical network and relay circuit synchronized with the measuring system and controlling circuits without affecting accuracy of the temperature reading at the control point. *Barber-Colman Co.*

For free copy circle No. 27 on postcard

Mine feed lines

A line of manganese steel pan feeders designed to handle shovelsore and stone is described in a new bulletin. Discussed with text, pictures and diagrams are the features and specifications of these feeders, together with typical installations. Capacities, chain tension and horsepower required for the feeders is also given. *Stephens-Adamson Mfg. Co.*

For free copy circle No. 28 on postcard

Strain gages

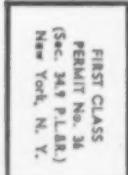
A comprehensive study of strain gages is contained in a new folder which discusses the type of strain (area, amplitude, complexity, frequency and duration), type of member (electrical conductivity, ductility and shape) and environmental considerations (temperature and humidity). Detailed analysis of resistance measurement with potentiometer and Wheatstone bridge circuits. *Consolidated Engineering Corp.*

For free copy circle No. 29 on postcard

THE IRON AGE

Post Office Box 77
Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States



Postcard valid 6 weeks only. After that use own letterhead fully describing item wanted.

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Along the FOOD LINE..



FIRST COST
*can be the LEAST COST if it's
the LAST COST*



AL STAINLESS STEEL
In various industries

Booklets currently available on the principal uses and methods of handling AL Stainless in the Dairy, Meat and Brewing industries (also Paper, Petroleum, Chemical, Textile, Laundry and Hospital fields). Others in preparation. Write for a copy in the field(s) in which you're interested.

ADDRESS DEPT. A-711

November 24, 1955

No material is more at home around food (or beverages, drugs, chemicals, etc.) than AL Stainless Steel. And that's not just because stainless is perennially good-looking, and so easy to keep clean.

Basically, it's because stainless steel equipment is the most economical you can buy. It stands up so much better—lasts so much longer—costs so much less to clean and maintain—that it actually saves you money in the long run. First cost isn't the whole story, you know. It's the long-term, over-

all cost that counts, and no other material is as hard, strong and resistant to heat, wear and corrosion as stainless steel.

So, when you want equipment that has to look well, maintain high sanitary standards and take a beating every day, remember that only stainless steel can give you the utmost in service and economy. • Use time-tested AL Stainless, and let us help you work out any design or engineering details. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*

Make it BETTER-and LONGER LASTING-with

AL Stainless Steel

Warehouse stocks carried by all Ryerson Steel plants



UNIT MACHINING COST CUT 17%
ON THIS GRAY IRON CASTING



... thanks to

FERROCARBO®

Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 87.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 42, Niagara Falls, N.Y. 14202

CARBORUNDUM®

**Like to speed up
your reading?**

Turn to pages 2 and 3
of The Iron Age every
week and let the

**Digest of the
Week in
Metalworking**

help you find your favorite features.

**IT PAYS TO READ
IRON AGE ADS TOO!**

TECHNICAL BRIEFS

INSPECTION: Test Weld Quality

Using Cobalt-60, this firm makes nearly 30 gamma-ray checks of weld quality weekly on valves, castings . . . Method is economical

Cobalt-60 is being used successfully and economically to test welds in piping, valves, and large and complicated alloy steel castings, by which walls as thick as 2½-in. are built up at the Toledo, O., plant of The National Supply Company.

Company metallurgists have been making nearly 30 gamma-ray inspections a week. They have found the method more satisfactory than either the shipment of these large parts to a commercial laboratory for inspection or the utilization of the services of such a laboratory when the testing equipment is brought into the plant for tests.

Radium Substitute

Use of cobalt-60, gives the company a source of gamma rays equivalent to that of radium costing more than 30 times more. Although cobalt-60 loses half its energy in 5.3 years whereas it takes radium 4000 years to lose this much, the radio-active material can be replaced several times at a small fraction of the cost of radium.

The cobalt-60 pellet is kept and used in a room with 18-in. thick concrete walls. To facilitate handling, the cobalt is contained in a stainless steel capsule handled with a 7-ft long aluminum rod having a releaseable magnet on the end. Various other safeguards are provided.

Inspection Procedure

To prepare for gamma-ray inspection, X-ray film is wrapped around the outside of a weld and metal numbers taped at several points for identification of film position and location of defects, if any. Penetrometers consisting of small pieces of steel about two

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 101. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

part of the metal thickness and with two or three holes through them are also taped on the metal near the welds as a means for comparing possible dark spots that indicate defects. The film is covered with opaque paper as protection against visible light rays.

The cobalt-60 is then put in position to emit its gamma rays through the weld, and is left in this position for periods ranging from 20 minutes to eight hours, depending upon conditions of test. A seven-foot aluminum rod with a magnet in its flexible end is used for safe handling of the tiny piece of radioactive material.

Exposure time depends upon strength of the radioactive material, thickness and density of test material, distance between the cobalt-60 and the film, and type of film. Time is computed before each test.



Cobalt-60 piece is placed preparatory to gamma ray inspection of a weld.

TECHNICAL BRIEFS

Cleaning:

**Power brushes speed
scraping operation**

Removing enamel insulation from copper wires, formerly a tedious hand-scraping operation, is now being done by a motor-driven brushing device in about one-fifth the time.

Insulation has to be removed from the wires to assure top quality soldering connections. This took 14½ minutes per armature when the manufacturer relied on the hand methods. With the power brush setup, time has been reduced to 3 minutes per unit. The two coiled wire brushes used were manufactured by the Osborn Mfg. Co.

The armature is turned during the operation. The two brushes rotate downward on the wires, and the insulation comes off cleanly.



This motor-driven brushing setup removes enamel from copper wires.

Metallurgy:

**Tunnels to release
ores for surface mining.**

In an engineering project unusual in open pit mining, The International Nickel Co. of Canada, Ltd., is driving two vehicular tunnels with a total length of 2200 ft in the walls of its Frood-Stobie open pit in the Sudbury district of Ontario. Aim is to permit greater recovery of ore by low-cost surface methods.

The tunnels, the company explains, will take the place of sections of the main ramp road which winds for almost two miles around the sides of the open pit, now nearly 600 ft deep. When com-

Kinnear Rolling Doors



Here is a **BIG** factor often overlooked by cost-minded business and industry: The floor and wall space . . . the time and labor . . . the upkeep and repair costs you can save with Kinnear Rolling Doors.

Opening straight upward, they coil out of the way. Their rugged, all-metal, heavily galvanized construction withstands hardest use . . . toughest weather conditions. Built any size, with manual or electric operation. Ideal for old or new buildings of any type.

Write for details on Kinnear Rolling Doors—the **BIG** value in door efficiency.

The KINNEAR Mfg. Co.

FACTORIES:
1740-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

Saving Ways in Doorways
KINNEAR
ROLLING DOORS



Pull the trigger and it's all over. In a split second an eye stud is fused to the head of a hot water heater tank, and the NELWELD® method has solved another materials handling problem by end welding a handle.

There are endless uses for Nelson studs in transporting heavy or awkward materials along the assembly line. Also, some forge shops are welding straight studs to billets to save material, speed up handling and reduce costs.

Whatever your hanging, handling or holding problems, your Nelson Field Engineer is qualified to analyze your requirements. Let him demonstrate how to eliminate expensive and complicated materials handling operations with the NELWELD® method. Write for details, indicating your problem.

Nelson

Faster it Better
at Less Cost
with



NELSON STUD WELDING
2733 Toledo Avenue
Lorain, Ohio

Please send literature on how NELSON studs are used in materials handling.

NAME _____

COMPANY _____

ADDRESS _____

CITY AND STATE _____

NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

pleted, pit traffic will be routed through the tunnels, and the affected portions of the ramp road will disappear as the ore over which they lie is mined. The usual surface mining procedure of churn-drilling, blasting and trucking will be used to recover the ore beneath the ramp.

Five-million Tons Involved

The ore is comprised of a large block in the footwall, as the wall on the underside of a vein or ore structure is known, and a smaller block on the hanging wall, or upper side. A total of 5,000,000 tons of ore is involved.



Completed, these tunnels will permit greater recovery at lower cost.

Originally it was planned to recover the ore by underground methods after all surface mining had been completed and the road was no longer required. The ore would then have been mined by the same methods as are being used in the south end of the Frood section of the pit, and also in the Stobie section, where surface operations have been replaced by blast-hole mining carried on from the 600-ft level underground.

Casting:

Precision investment process
permits thin sections.

Aluminum can be cast as thin as 1/32 in. and steel as thin as 3/64 in., with 60 to 120 micro inch finish by means of an investment casting method recently highlighted. Tolerances can be held to ± 0.005 in. per linear inch.

The process, used by Jelrus Precision Casting Corp., New York, can accommodate any castable metal, including all the soft metals, mild steel, tool steel,

TECHNICAL BRIEFS

stainless steel and all alloys.

Small parts $\frac{1}{4}$ in. or less can be held to ± 0.003 in. Tolerances on bulky parts or sections are held to $\pm 1/64$ in.

The investment castings are heat treatable to the same hardness and tensile strength as bar stock. With the close tolerances and fine finish possible, very little additional machining is necessary.

Milling:

Tape-controlled machine readied for airframe use.

First full scale test of the theory of automatically controlled machines in airframe manufacturing will begin shortly at Martin Aircraft Co., Baltimore.

A Bendix electronic control system will be applied to a DeVlieg horizontal milling machine in the first experiment. The project is sponsored by the U. S. Air Force, and is a production adaptation of the numerical control system under development at M. I. T.

In the numerical control system, design information is coded on a tape. The tape transmits this information, through electronic control units, directly to the milling machine. This eliminates many conventional, time-consuming, and error-provoking steps, such as 1) calculating coordinates, 2) laying them out on a loft, 3) photographing the loft, 4) distributing it to a toolmaker who makes a template to match the loft layout, and 5) using the template on a profile milling machine to make the part. Simplification of these procedures will speed the tooling and production of new models.

The tape also is a compact storage medium for design data. It is economical, comparably non-perishable and quickly available for reuse. It can be delivered quickly to subcontractor's plants. Its impulses can be transmitted on teletype circuits to one or more dispersed machines. It can be duplicated as needed.

No conventional method of storing design information can match

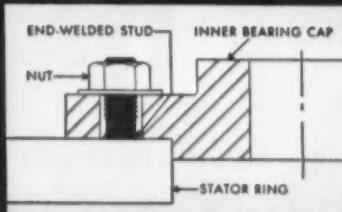


"STUD" NELSON ATTACHES SUB-ASSEMBLIES IN A FLASH!

Easy does it . . . a NELWELD® gun makes the placing of attachment studs a simple operation . . . takes the tool to the work . . . cuts costly material handling . . . eliminates drilling and tapping.

Studs stay put! . . . NELSON® welded studs fuse with the parent piece to become an integral unit, equally strong at the weld.

Trigger fast, tool . . . push a button and you've got a weld.



. . . just a few reasons why the NELWELD system is the practical way to attach fixtures, brackets, bearings, accessories, pillow blocks, and endless sub-assemblies.

A corps of Nelson experts is trained to help co-engineer better fastening with inevitable cost reduction. And the Nelson network of factory warehouses blankets the country . . . puts studs, equipment, and rentals right in your own back yard! Write for details.

Stud Nelson

Faster it Better
at Less Cost
with



NELSON STUD WELDING
2737 Toledo Avenue
Lorain, Ohio

Please send more information on stud welding
sub-assemblies and other applications.

NAME _____

COMPANY _____

ADDRESS _____

CITY AND STATE _____

NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES INC. LORAIN, OHIO

"Tape is fed into a computer which converts program data to control data . . ."

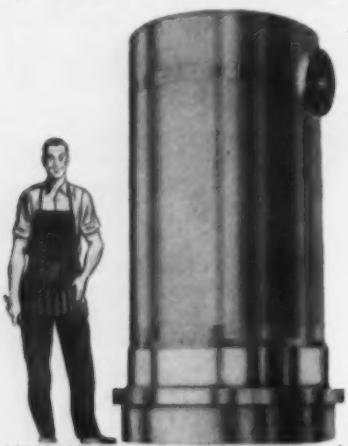
this flexibility, inherent accuracy, and contribute so much to quick emergency mobilization.

The program tape is fed into a computer which converts program data into control data punched on a machine control tape. Numerical data for cutting standard arcs and

other routine movements will be pre-programmed on magnetic tape and stored in the auxiliary storage unit. When such movements occur in the program for a specific part, the director computer automatically draws this data from storage. The control tape will then be used in the machine control unit to quite the movements of the milling machine cutter to produce the part.

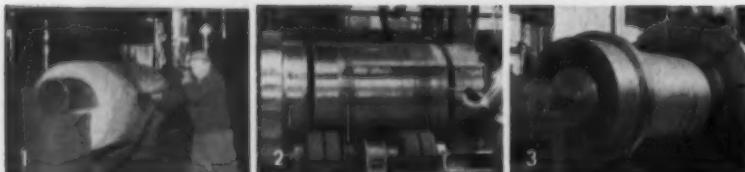
The milling machine is a standard production model precision, three-axis, horizontal milling machine. A horizontal spindle machine was selected for its inherent rigidity in the machine frame, versatility in function and work range, convenient operator position, convenience of set-up, and natural drainage of chips and coolant.

Need Large Hydraulic Cylinders?



BUILT TO REQUIRED SIZES AND TOLERANCES BY

TITUSVILLE FORGE



Hydraulic cylinders combining the advantages of thoroughly hot worked steel and clean automatic welding are being furnished by Titusville. Such cylinders insure the user of better physical characteristics (hollow forged shell and flanged sections together with upset forged top or dome sections), freedom from leakage under pressure because of porosity and the complete elimination of costly repairs or rejections. Fabrication is shown in photos above.

1. Hollow forging for shell section being hot worked on mandrel.
2. Hollow and upset forgings assembled for automatic welding.
3. Complete welded cylinder being rough turned in 80" engine lathe.

Let Titusville Forge build your hydraulic cylinders—to your most exacting requirements.

STRUTHERS WELLS CORPORATION

TITUSVILLE FORGE DIVISION

TITUSVILLE, PA.

PLANTS AT TITUSVILLE, PA., and WARREN, PA.

Offices in Principal Cities



Six-year record of dynamic braking on this crane has been excellent.

single crane bridge drive motor burnout has been experienced.

The controllers provide electrical braking by separately exciting the series field of the drive motor from the power source to positively decelerate the crane. Braking is applied by means of a limit switch located beneath the regular foot brake pedal. When the operator wishes to stop his crane, a slight depressing of the brake pedal closes the limit switch and applies dynamic braking, thus absorbing the crane's initial momentum. Additional pressure on the

pedal actuates the standard foot brake to bring the crane completely to rest.

Installed in 1949

Although the overhead traveling cranes equipped with dynamic braking were installed in Alcoa's Texas plant in 1949, and now have been in operation over six years, not a single foot brake lining has required replacement to date. The cranes are used to transport heavy pots of molten aluminum at high speed an average distance of approximately 500 ft on a 1000-ft runway.

In a recent examination of the foot brake linings, wear was found to have averaged only 1/16 in., with three times this wear still permissible before replacement would be considered necessary.

Testing:

Enlarged wind tunnel permits higher speeds.

Both the Southern California Cooperative wind tunnel and its capabilities were "stretched" recently, when the old tunnel was cut in half, separated, and two new 20,000 hp Westinghouse drive motors inserted inside.

The original 12,000 hp drive now serves as a starting power supply, and as a variable-frequency drive supply for the motors at low horsepower. The new 40,000 hp drive makes an air speed of mach 1.80 possible in the 8½ by 11½ ft test section.

The tunnel is operated for sponsoring companies by the California Institute of Technology.



New 20,000 hp Westinghouse drive motors boost wind tunnel capacity.

Hardfacing:

Metallizing beats flood emergency

Shawinigan Water and Power Co. of Quebec, Canada, recently shut down a 10,000 hp vertical hydro-electric unit merely to clean the winding of the generator and renew some cooling-water piping.

Upon dismantling the machine and lifting the rotor it was found that the thrust collar was loose and out of alignment. Also the vertical key which holds the collar in place on the shaft had started to roll in the keyway. A thrust collar on vertical hydro units supports the Kingsbury bearing which, in turn, supports the combined weight of generator

CAN YOU AFFORD THERMOCOUPLE FAILURE?



PEERLESS RESTORER®
GIVES YOU PUSH BUTTON REPAIR OF
FAULTY THERMOCOUPLE CIRCUITS

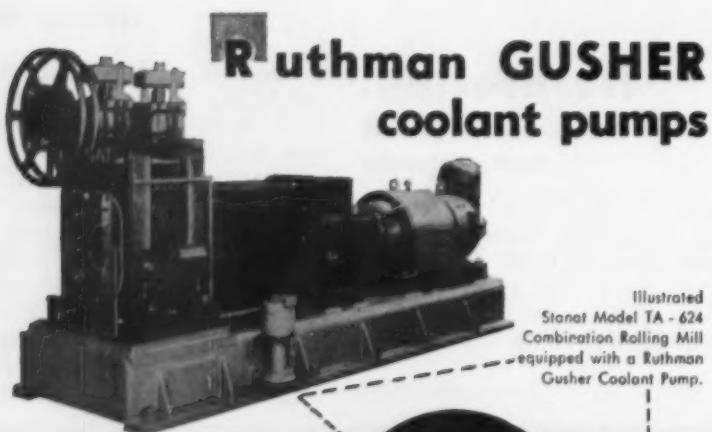
Loss of a heat, reheat-treats and costly maintenance often result from errors caused by faulty thermocouple circuits. Even the most modern electronic instruments depend on good circuits to register actual furnace temperatures. The Peerless Restorer operates with your presently installed instruments to detect and correct thermocouple circuit failure instantly DURING ANY HEAT.

SEND FOR CATALOG R-22



STOP
Ruined Heats
Reheat-treats
Costly Maintenance

THE PEERLESS ELECTRIC COMPANY • WARREN, OHIO
FANS • BLOWERS • MOTORS • ELECTRONIC EQUIPMENT



Each Gusher Coolant Pump is precision built — a credit to the metal working machines in which they are installed. The dynamically balanced rotating assembly cuts vibration and wear to a minimum. Pre-lubricated ball-bearings require no further attention. There is no priming or packing necessary. Your Gusher Coolant Pump is a highly efficient precision machine.

Illustrated
Stanat Model TA - 624
Combination Rolling Mill
equipped with a Ruthman
Gusher Coolant Pump.



THE RUTHMAN MACHINERY CO.

1809-1823 Reading Road

Cincinnati 2, Ohio

NON-FLUID OIL

TRADE MARK

REGISTERED

SOLVES PRESSURE PROBLEMS

NON-FLUID OIL

1. DOES NOT DRY OUT LIKE ORDINARY GREASES!
2. WILL NOT SEPARATE UNDER PRESSURE!
3. WILL NOT CHOKE THE SYSTEM!
4. CONTAINS NO RESIDUAL MATTER TO CLOG FITTINGS!

Send for free testing sample of NON-FLUID OIL, without obligation. Try it once, and you will see why NON-FLUID OIL always sells itself in action!

NEW YORK & NEW JERSEY LUBRICANT COMPANY

292 Madison Ave., New York 17, N. Y. • Works: Newark, N. J.

WAREHOUSES: Birmingham, Ala. • Atlanta, Ga. • Columbus, Ga. Charlotte, N. C. • Greensboro, N. C. • Greenville, S. C. • Chicago, Ill. Springfield, Mass. • Detroit, Mich. • St. Louis, Mo. • Providence, R. I.

Also represented in other principal cities

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

rotor, shaft and turbine runner. In this case, about 85 tons.

Flood Period Approaching

The overhaul was being undertaken some six weeks prior to the Spring flood period and time was at a premium. It would have been extremely embarrassing to be caught, on a river subject to 'flash' floods, with no stop-logs in the tail-race to cut water flow and with a dismantled turbine.

Consideration was first given to building up the inner diam of the thrust collar by applying chromium or nickel by electroplating. This meant shipping the part outside. But the firm involved could not promise a satisfactory delivery date, so it was decided to metallize.

Procedure Used

Metallizing Engineering Co., Inc., Westbury, L. I., N. Y., first set up the thrust collar in a large lathe and bored true. Eight V threads to the inch were then cut on the inside and this was followed by roughing with a Metco rotary shaft preparing tool. For additional bonding about 0.003 in. of molybdenum was applied and the build-up was completed with 0.25 pct C steel, sufficient to allow for finishing. A metallizing gun with a 24-in. extension and angular air cap was employed for the entire metallizing operation.

The job was completed in only two working days. This time covered all phases of work, preparation, metallizing and grinding.

Brazing:

Suggestions on
the place of preforms

There are two methods for applying filler metal to the joint when brazing: hand feeding to introduce the filler metal from a length of wire or rod or preplacement, in which the filler metal is cut and shaped into a preform to conform to joint contours. The choice depends on the particular production situation.

Handy & Harman, manufacturer of silver alloy filler metals

and fluxes for brazing, offers the following information as a guide in evaluating the two.

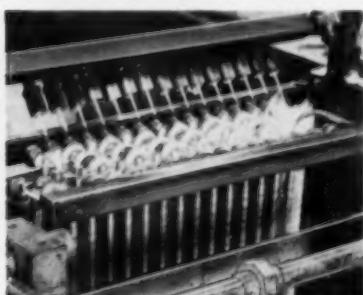
Hand-Feeding Factors

Hand feeding is usually done only with hand-torch brazing. Some of the factors which dictate the use of hand feeding are production rate, geometry of the part and size of the joint. For example, there may be no shoulder or groove where the preform can be placed. Or parts may be so small that preforms would be too delicate to handle. Or the shape of the parts may be so irregular that it would be too difficult or wasteful to fabricate the preforms.

Also, for low production or short varied runs, it may be impractical to purchase or fabricate preforms when one or two sizes of rod or wire could fill a variety of brazing requirements.

Preplacement Advantages

Preplacement offers many advantages, provided production volume is high enough to justify the cost of fabricating preforms. Among these are that it permits choice of any type of heating method, including hand torches, conveyors or rotary tables with



Replacing permits brazing 40 heat exchanger joints simultaneously.

fixed burners, induction heaters, furnaces, and others thus opening the way to mass production brazing and lower joining costs. It gives accurate control over quantity of filler metal used per joint, and puts the filler metal where it's needed, including less accessible parts of the joints. It also eliminates the need for skilled operators.

Most silver alloy brazing fillers flow very easily when molten, so

that it is often unnecessary to go to the expense of duplicating the exact shape of the joint in the preform. Thus a square piece of filler metal can frequently be substituted for a disc of equal volume, and the waste encountered in stamping out the disc is eliminated. Whenever possible washers should be stamped from wire rings rather than punched from sheet stock.

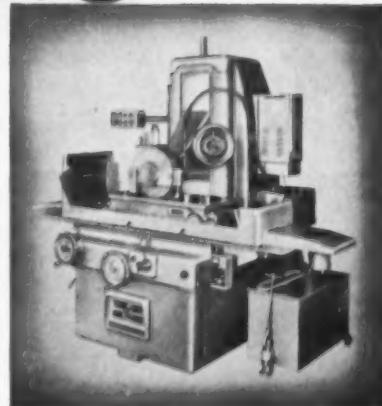
Before specifying an elaborately shaped preform, it is well to check whether several pieces of wire laid along the joint seam might do the same job. Because of the high ductility and formability of most silver alloy filler metals, the wire, rod and thin strip usually can be formed into rings, hairpins and other shapes simply by bending over a form of appropriate shape.

FOUND WHERE WORLD FAMOUS TRACTORS ARE "BORN"

GRAND RAPIDS GRINDERS



The makers of these famous tractors and allied heavy-duty equipment use Grand Rapids Grinders in their toolrooms. In fact, you'll find Grand Rapids Grinders wherever manufacturers place a premium on precision... because they're designed and built for lifetime precision grinding. Take our Model 560, shown at right. Its column and base are a massive, one-piece casting for permanent, rigid alignment. Wheel head has powered rapid vertical travel; cross feed and longitudinal travel table are hydraulically actuated. Table speed is variable up to 140 fpm, making this the *fastest* grinder of its type and size! If you're not already enjoying these standout features in your toolroom, a note on your letterhead will bring full details.



Grand Rapids No. 560 Hydraulic Feed Surface Grinder. Table speed up to 140 fpm. Working surface of table is 14" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1800 and 2140 rpm.



GALLMEYER & LIVINGSTON CO.

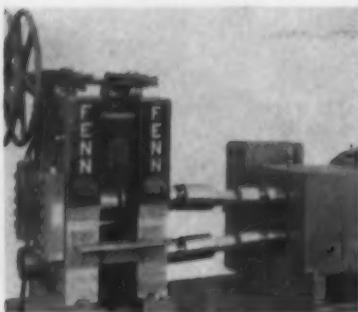
Write for full information.



400 STRAIGHT AVE., S.W. GRAND RAPIDS, MICHIGAN

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 101 or 102

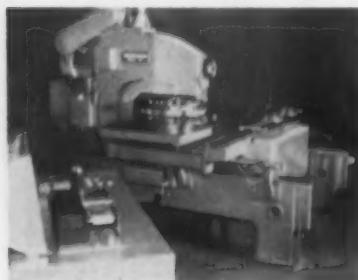


Automatic slug caster for aluminum forgings

Aluminum slugs can be produced automatically from ingot metal for aluminum forging or impact extrusion by a new automatic slug caster. Machine has a pan and water-cooled mold, both of which enter the melting furnace well. Aluminum enters the mold through a gate in the pan, and after cool-

ing, pan and mold shift to shear off the solidified gate. Then, as pan and mold rise from the metal, they separate. Slug is then ejected down the chute from which it would be set into tote pans, conveyorized, etc. *Stroman Furnace & Engineering Co.*

For more data circle No. 31 on postcard, p. 101

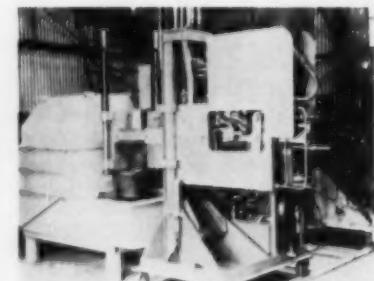


Pneumatic billet marker has new features

New developments in a pneumatic billet marker include a special air-operated positioning unit with a four-way valve for operator control. A 6 ft air cylinder provides operating power and enables stamping machine operator to position the marker in front of slab or billet.

Special marking head includes heavy duty marking wheels for ingot number and cut letter identification. Operator can be situated in control tower or other vantage point for spotting end of bloom, slab or billet. *M. E. Cunningham Co.*

For more data circle No. 32 on postcard, p. 101

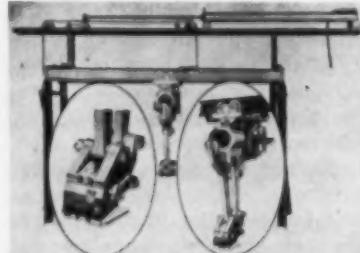


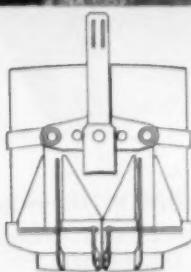
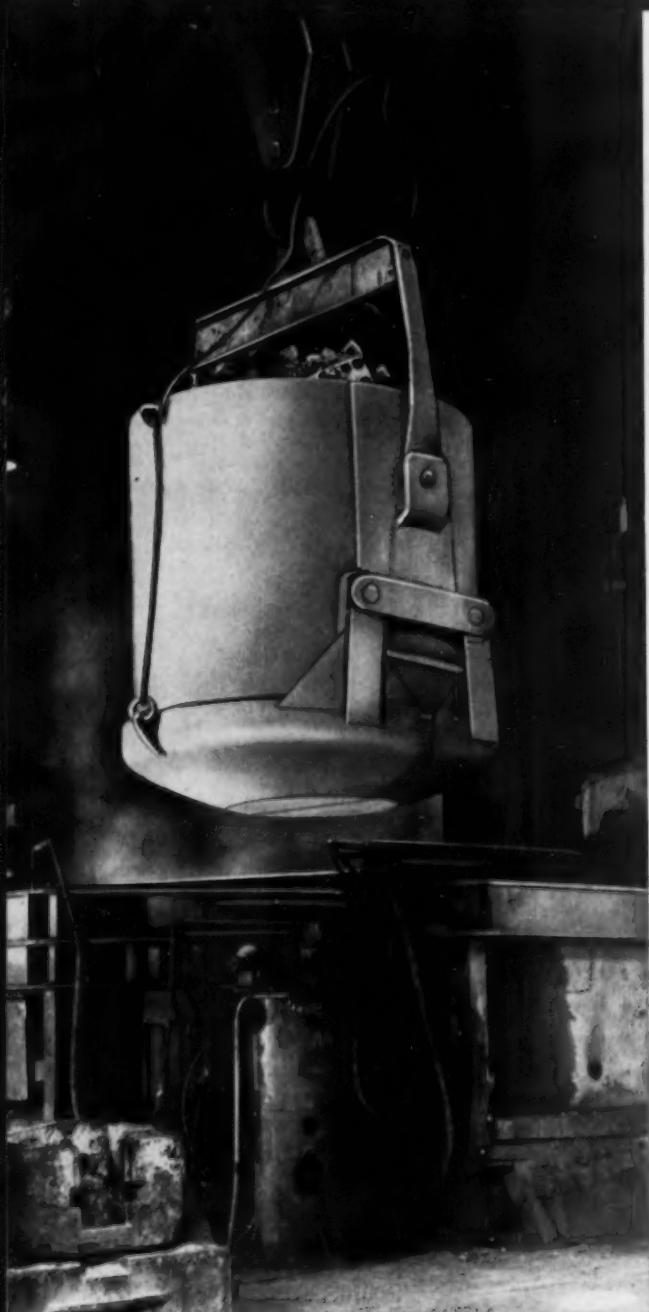
Automatic punch press for complex patterns

An automatic turret punch press has been developed for complicated hole patterns. With this unit openings of many sizes and shapes are located and punched in large steel sheets. The press and work locating table are controlled by a tape fed, electro-mechanical programming unit. This unit performs all

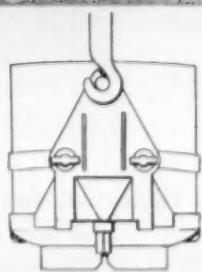
functions—simultaneously positioning work under the punch, selecting the turret station carrying proper punch and die (anyone of twenty up to 6 in. sq.) and tripping the press. Cycle is automatically repeated until all holes are punched. *Wiedemann Machine Co.*

For more data circle No. 33 on postcard, p. 101





FIXED BAIL



REMOVABLE BAIL

You are invited to visit our suite at the Hotel William Penn during the AIME Conference, December 7, 8, 9, Pittsburgh, Pennsylvania

STEEL PLANTS Separate **MEN** from **BOYS**

*That's why Central
Fabrications exceed
Specifications!*

Yes, in many cases where additional weight does no harm, we throw the specs out of the window — and you get a job that gives you a minimum of maintenance headaches for years to come. Central Fabrications take their place among the "men" in primary metal plant equipment because we know they'll get slammed around and we build them to stand up to rough treatment!

Our clam-bottom scrap buckets, for example, have design and structural features which now set the pace for the industry and our engineering department is continually at work to make all such equipment more rugged, easier to maintain, safer, less costly. Some of the most progressive plants in the world tell us that our modern engineering service, *backed by 115 years of heavy fabrication experience*, has made a valuable contribution to their efficiency.

Think of Central for every type of welded or riveted fabrication. Just send prints for quotation and depend upon our experienced representatives to work closely with your engineering staff to the completion of the job.

ENTRAL BOILER AND MFG. CO.

5819 RIVARD ST. • DETROIT 11, MICHIGAN

PRODUCTS FOR THE STEEL MILL: CLAM-BOTTOM TOP CHARGING BUCKETS • ALL-WELDED INGOT CARS COIL HOOKS • TRANSFER TABLES • LADLES & LADLE HOOKS • WATER-COOLED ROOF RINGS DOOR FRAMES & WORKING PLATFORMS • MILD & STAINLESS STEEL ANNEALING COVERS & BASES

ALSO HEAVY FABRICATION FOR THE CHEMICAL, REFINING, PROCESSING & GENERAL MANUFACTURING INDUSTRIES



Unit construction featured in single spindle automatic

A new single spindle automatic—composed of ten individual units including the machine base—offers unit construction which maker claims will decrease expenditures for new equipment. As improvements or innovations are introduced users of the machines can replace existing units as required.

The ten units included are: spindle housing, chucking and trip lever assembly; main spindle unit; vertical slide attachment; gear box; base; cross slides; six position turret; drive motor; drive unit; and turret slide assembly. *Gear Grinding Machine Co.*

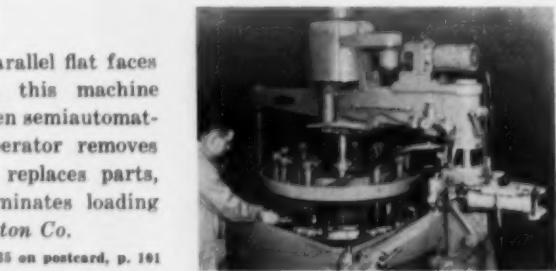
For more data circle No. 34 on postcard, p. 101

Single or parallel face flat lapper

A machine designed for either single or parallel face flat lapping can be arranged for plain, timed cycle, automatic continuous feed or semi-automatic continuous feed. For single face lapping the machine mounts a single 48 in. diam bonded abrasive wheel lap on a vertical

spindle. Opposed parallel flat faces can be lapped in this machine simultaneously. When semiautomatic feed is used, operator removes finished work and replaces parts, automatic feed eliminates loading and unloading. *Norton Co.*

For more data circle No. 35 on postcard, p. 101



Turning lathe for metal cutting research

Designed to carry out practically any desired type of cutting test, a new turning lathe can provide variable cutting speeds from 625 rpm to 3775 rpm and higher with special pick-off gears. With this lathe, the resistance of a metal to plastic deformation and the amount of energy converted to heat can be

measured and normal tool wear computed. The lathe offers a clearance diameter of 15 in. and a swing over the compound of 8 in. Adaptable to study special tools and tool geometry for material control and for research. *Monarch Machine Tool Co.*

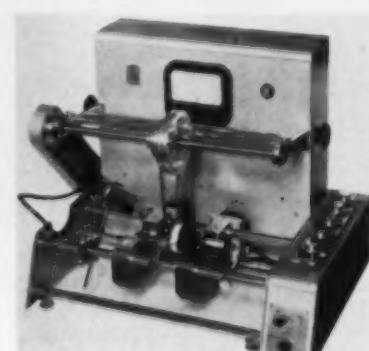
For more data circle No. 36 on postcard, p. 101

Electronic balance unit for rotors, armatures and fans

A high precision electronic balancing machine enables small cylindrical bodies (such as rotors, armatures, fan units, etc.) to be dynamically balanced. The machine measures unbalance in two planes of correction and locates the unbalance angularly by means of a stroboscopic lamp. Parts or assemblies up to 13 in. long, 5 in. wide and 10 lb in weight can be handled. The part or assembly to be

balanced is supported and rotated at 2700 rpm. Vibrations due to unbalance are picked up and converted to voltage. This current is amplified so even minute vibrations give readings. The vibrations also actuate a stroboscopic lamp which angularly locates the unbalance. All controls are preset except those necessary for operator. *The Hickok Electrical Instrument Co.*

For more data circle No. 37 on postcard, p. 101



Air cargo tie-downs for 10,000 lb service

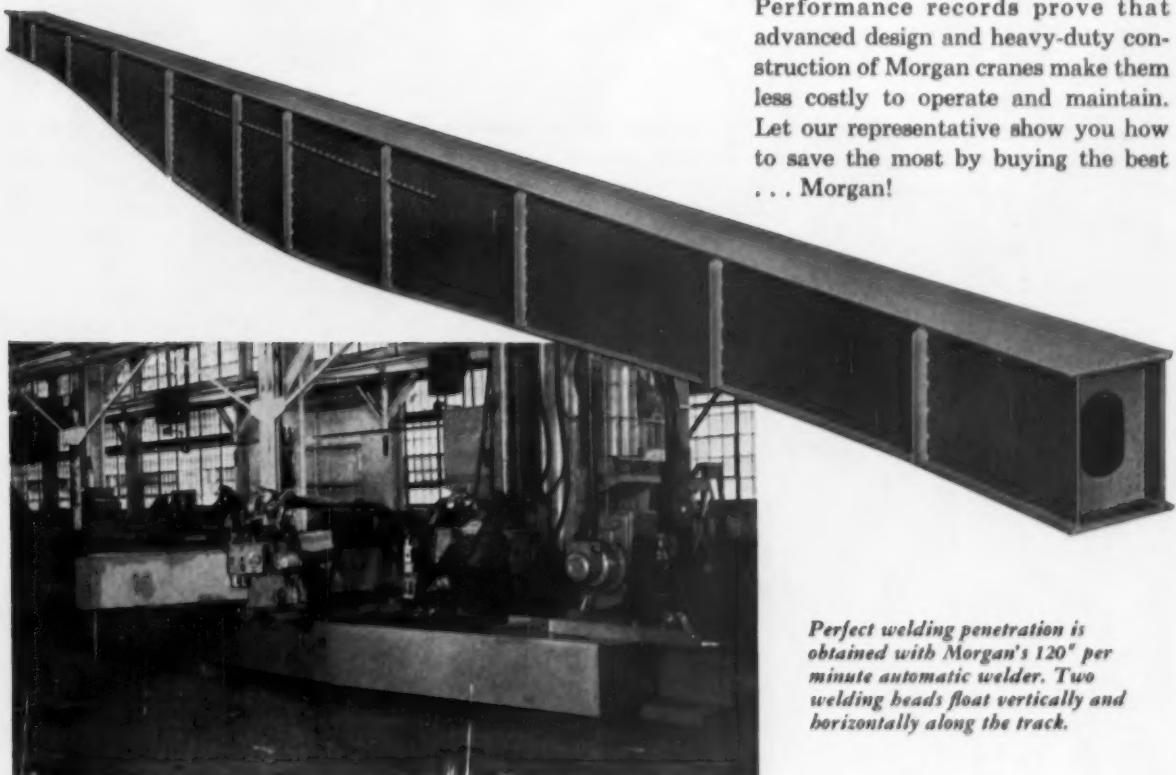
Air Force-approved cargo tie-downs for 10,000 lb service, now available, provide a weight-reduction over previous equipment and make possible simplified initial application, tensioning and release up to 5000 lbs. In these MB-1 tie-downs the chain is automatically locked into position as it is in-

serted into the slot. This locking device replaces the two-step, rotating locking mechanism previously used in tie-downs. These MB-1 tie-downs exceed Air Force specifications for hand tensioning. *Eastern Corp.*

For more data circle No. 38 on postcard, p. 101

Turn Page

How Morgan cranes get a stiffer backbone ...automatically

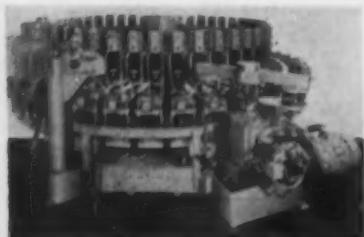


Perfect welding penetration is obtained with Morgan's 120" per minute automatic welder. Two welding heads float vertically and horizontally along the track.

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

NEW EQUIPMENT



Rotating brake band bonding machine

A new rotating brake band bonding machine, with completely balanced weight, contains 42 stations. A large ball-bearing, 6 in. in diameter, provides its stability and eliminates vibration. The unit bonds 360 brake linings per hour

to the steel bands by low voltage electric heating elements. The machine offers semiautomatic loading, automatic unloading, and one-shot lubrication. *Distel Tool & Machine Co.*

For more data circle No. 39 on postcard, p. 101

Straightening machine for upset-end tubing

A new line of 7-roll straightening machines incorporates a large driven roll with two opposed idler rolls located at the entry end and another similar cluster at the de-

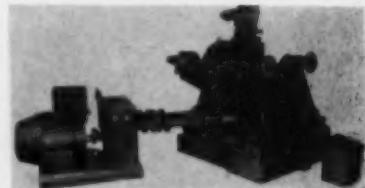
livery end, with an unopposed pressure roll between. This arrangement confines work to the pass-line. *Sutton Engineering Co.*

For more data circle No. 40 on postcard, p. 101



Foundry core coating for gray iron, brass and bronze

A graphite base foundry core coating has been newly developed. Recommended for gray iron, brass, bronze and special alloys the coating, called Graph-Kote, is said to allow cores to be dipped faster and



permit coatings to stay on the dipped core areas so that prints and assemblies fit accurately. Cleaning of cores prior to setting is reduced. *Frederic B. Stevens, Inc.*

For more data circle No. 41 on postcard, p. 101

New forging press

Rated at 1000-ton, a new hydraulic forging press is designed to forge jet engine turbine blades. It completes a 6-in. stroke cycle in a few seconds. The press incorporates speed control with auto-



"It's an emergency! Go to Columbia's warehouse and pick up our order for ATMODIE SMOOTH CUT!"

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.



matic pressure and precision reversal by means of a special compression and decompression feature. Can be arranged for semi-automatic single cycle or push button operation. *Erie Foundry Co.*

For more data circle No. 42 on postcard, p. 101

King-size

GRAY

Here is one of the year's largest planers, a GRAY, immense in size, yet so superbly engineered and magnificently built that its precision performance is a marvel to behold.

All GRAY planers from king-size Giants to eager Cubs are built for high production. They have more original engineering developments and production features than any other planer.

They are in such demand that GRAY is the largest planer builder, further proof that

Quality doesn't cost . . . it pays.

The G. A. GRAY Co., Cincinnati, Ohio

**call
Ryerson
for steel**

CARBON STEELS

Hot rolled and cold finished bars; channels, angles, beams, etc.; plates of every kind.

STAINLESS STEELS

World's largest stock of sheets, plates, bars, pipe, tubing, fittings, etc.

TUBING

Mechanical and pump cylinder tubing, seamless and welded; hydraulic fluid line and boiler tubes; structural tubing, etc.

ALLOY STEELS

Tested alloys of known hardenability, standard and aircraft quality, as rolled, annealed, heat treated.

SHEET AND STRIP

Over 20 kinds and many gauges—in pattern sizes or cut to your order.

Quick delivery from nation's largest stocks

Need steel in a hurry? Ryerson stocks are the nation's largest, so one call to your nearby Ryerson plant brings quick delivery of almost any kind of steel in almost any quantity—all of it certified for high uniform quality.

Do you want your steel prepared for immediate use? Ryerson facilities include the most modern close-tolerance equipment for sawing, shearing and flame cutting to your specifications.

Of course, current heavy demand makes it

difficult to keep all sizes always on hand but our stocks are being replenished continuously. Steel that's out of stock today may be in stock tomorrow. And experienced Ryerson steel men will help you make the most of steel on hand. So for everything in steel and steel service . . . call Ryerson.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N.C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

**Steel launches big expansion program . . . But consumers face more trouble ahead . . .
Higher prices seen after turn of year . . . Production cutbacks growing.**

Help On Way . . . Amid the near-chaos of the worst steel shortage since Korea, steel producers have launched another expansion program aimed at meeting increased requirements of a growing economy.

A survey by THE IRON AGE indicates that in the next four years the industry will expand ingot capacity by approximately 16 million tons. The tab will come to over \$3 billion.

But meanwhile the steel consumer can look forward to nothing but woe from a procurement standpoint well into 1956. There's no chance of relief until third quarter, if then.

And at least part of expansion costs will come from higher steel prices. The industry has not denied reports that prices will rise after the turn of the year. If anything, industry leaders are encouraging this talk by repeatedly stressing the need for higher prices. Some smaller producers have already increased base prices of hot-rolled sheets, strip, plates, and flats. Several large companies have adjusted extra charges.

Production Cutbacks . . . For the steel consumer, this will mean two price boosts in 1956. The industry is likely to adjust prices again after settling with steel labor, just as it has in the past.

The shortage has forced many steel users to cut back production. The list of companies affected include manufacturers of appliances, farm equipment, earthmoving equipment, railroad car builders, and heavy tank fabricators. Job stamping shops also have been hard hit.

Even without a formal price boost, steel costs for many consumers have skyrocketed. This is brought about through the necessity of costly conversion deals, buying from brokers, and obtaining emergency requirements from warehouses.

One small company, which is not necessarily a cross-section, figures it is receiving about 20 pct of its steel from a mill and about 80 pct from warehouses, the opposite of its normal ratio.

Backlogs Growing . . . Lack of structurals is shoving practically all structural jobs behind schedule. This condition has affected municipal operations in areas where modern highways or throughways are being built.

Steel production this year will reach or exceed 116 million ingot tons. But despite this, producers have been unable to cut back on their backlog. The result: heavy tonnages of dammed-up demand going into 1956.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week	Last Week	Month Ago	Year Ago
Ingot Index (1947-1949=100)	148.7	148.7	150.0	120.0
Operating Rates				
Chicago	98.5	99.0*	97.5	89.5
Pittsburgh	103.0	101.0*	105.0	77.0
Philadelphia	102.0	102.0	104.0	70.0
Valley	99.0	99.0*	99.0	79.0
West	101.0	99.0*	98.5	84.0
Detroit	95.0	96.0	95.0	88.0
Buffalo	105.0	105.0	105.0	97.5
Cleveland	99.0	102.5*	104.0	80.5
Birmingham	94.0	94.5	94.0	64.5
S. Ohio River	93.0	95.0*	92.0	88.0
Wheeling	104.0	104.0*	100.0	81.0
St. Louis	109.0	98.0	97.0	82.0
Northeast	97.0	97.0	97.0	66.0
Aggregate	99.0	99.0	100.0	80.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	\$59.09	\$59.09	\$59.09	\$56.59
Scrap, No. 1 hvy (gross ton)	\$45.83	\$45.17	\$44.50	\$32.83
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	22.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.30	15.30	15.30	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	63.08
Tin, Straits, N. Y.	98.875	98.875	96.50	90.75
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

Price Pressure Builds Up

Acme Steel boosts prices of hot-rolled sheets and strip . . . Action follows earlier moves on carbon plates by mills in the East . . . Extras, premiums show trend.

◆ PRESSURE on steel prices is increasing. Acme Steel Co. has increased prices of hot-rolled sheets and strip by \$4.50 per ton to \$91. Earlier, Lukens Steel Co. and Northeastern Steel had boosted prices of carbon plates. Northeastern also increased its base on hot-rolled strip and flats.

The growing number of smaller firms forced to adjust base prices may prove to be the forerunner of more extensive increases. Indications are that the industry generally is contemplating price boosts on selected list of products early next year.

As an indication of the tight market in structural, Jones & Laughlin Steel Corp. raised its extras on junior beams and junior channels in a range of \$6 to \$20 per ton.

Youngstown Sheet & Tube Co. has reinstated a premium of \$5 per ton on plates over 5/16-in. thick and 300 in. long. The premium is based on extra hauling of plates in this gage and length from Campbell Works to Brier Hill works for shearing. The premium had been dropped last year, when business was slow.

Prices of South American, African, and some Swedish iron ores have gone up by \$1 to \$1.50 a ton in the last week and a price hike in domestic and Canadian ores for next year's season is in the works.

SHEETS AND STRIP . . . Chicago producers are sold out for 1st quarter with carryovers absorbing up to 50 pct of some consumers' 1st quarter quota. In a number of cases, quotas themselves have been reduced. Hot-rolled deliveries, somewhat easier than cold-rolled, are running about 30 days behind schedule. This is fading, however, as eastern mills reduce production.

order books open in Chicago, plate producers are reporting they'll be sold out at least six months in advance. Conversion deals are already heavy in plate, particularly in light plate.

STRUCTURALS . . . One eastern producer is currently rescheduling all logjammed orders on standard and wide-flange in an attempt to get current on delivery by year's end. Demand for structural looks like it will continue at a record-breaking clip in Detroit at least through 3rd quarter. Warehouse inventories in the auto capital are below 50 pct of normal. In spite of some falloff in new building contracts in Chicago, there's still a 30-day delivery carry-over on standards. Wide-flange demand is solid for the first six months of '56, with most producers expecting capacity operations to keep up the entire year. 1st quarter structural business in Pittsburgh is nearly all carry-over tonnage from 4th quarter. And, in Cleveland, some structural orders accepted for July rolling schedules have yet to arrive at consumer doorsteps. Deliveries generally are running three months late on heavy structural. West Coast mills anticipate good-size orders will come through soon for refinery construction work and highway bridge building.

WIRE PRODUCTS . . . Order books have just opened for an eastern producer on manufacturers wire and wire rod for 1st quarter. With demand outstripping production, this producer is scanning carefully all new orders, is accepting new business on a limited basis for 1st quarter delivery. Situation is easier in merchant wire items with barbed wire, twisted barbless, and bale tie movements expected to be considerably lighter in 1st quarter, showing a noticeable pickup in 2nd quarter. Demand for spring wire continues extremely heavy in Detroit. 4th quarter carryovers going into 1st quarter '56 are expected to run a month or more. In Chicago, all manufacturers wire is running at capacity clip, is expected to continue at top demand for the first two quarters of next year.

Purchasing Agent's Checklist:

AIRCRAFT: How big a stake has metalworking? p. 39

LABOR: Incentive pay helps indirect workers p. 45

STEEL: Foundries are pushing capacity p. 46

FINANCIAL: Federal Reserve has new economic barometer . . . p. 48

TECHNICAL: Strip coating saves refinishing costs p. 83

PIG IRON . . . U. S. Pipe and Foundry Co. will start work in a few weeks on a 1000-ton-a-day blast furnace at its North Birmingham, Ala., plant. Due for completion in 18 months, new furnace will increase monthly pig iron capacity of the company's Birmingham's plants from 50,000 to 80,000 tons a month.

Comparison of Prices

(Effected Nov. 12, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type;
declines appear in *Italics*.

	Nov. 23 1955	Nov. 15 1955	Oct. 25 1955	Nov. 23 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates wrought iron	9.30	9.30	9.30	9.30
Stainless C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.05	\$9.05	\$9.05	\$9.05
Terneplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. terne	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	\$4.725	\$4.725	\$4.725	\$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	\$68.50	\$68.50	\$68.50	\$64.00
Slabs, rerolling	88.50	88.50	88.50	84.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Fig. Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

PIG IRON

Dollars per gross ton, f.o.b.,
subject to switching charges.

→ To identify producers, see Key on P. 132 →

STAINLESS STEEL

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phes.
Bethlehem <i>H3</i>	60.50	61.00	61.50	62.00	
Birdsboro, Pa. <i>B6</i>	60.50	61.00	61.50	62.00	
Birmingham <i>R3</i>	54.50	55.00*			
Birmingham <i>W9</i>	54.50	55.00*	59.00		
Birmingham <i>U4</i>	54.50	55.00*	59.00		
Buffalo <i>R3</i>	58.50	59.00	59.50		
Buffalo <i>H1</i>	58.50	59.00	59.50		
Buffalo <i>W6</i>	58.50	59.00	59.50	60.00	
Chester <i>C17</i>	60.50	61.00	61.50		
Chicago <i>I4</i>	58.50	59.00	59.50	59.50	
Cleveland <i>A5</i>	58.50	59.00	59.50	59.50	63.50
Cleveland <i>R3</i>	58.50	59.00	59.50		
Duluth <i>I4</i>	58.50	59.00	59.50	59.50	
Erie <i>I4</i>	58.50	59.00	59.50	59.50	
Everett <i>M6</i>	62.50	63.00			
Fontana <i>K7</i>	64.50	65.00			
Geneva, Utah <i>C7</i>	58.50	59.00			
Granite City <i>G2</i>	60.40	60.90	61.40		
Hubbard <i>Y1</i>			59.00		
Lone Star <i>L3</i>		55.00			
Minneapolis <i>C6</i>	60.50	61.00	61.50		
Menomonie <i>P6</i>	58.50				
Neville Is., <i>P4</i>	58.50	59.00	59.50		
N. Tonawanda <i>T7</i>		59.00	59.50		
Pittsburgh <i>U1</i>	58.50				59.50
Sharpsville <i>S1</i>	58.50	59.00	59.50	59.50	
Sa. Chicago <i>R3</i>	58.50		59.50		
Steeltown <i>B3</i>	60.50	61.00	61.50	62.00	66.50
Swedenland <i>A2</i>	60.50	61.00	61.50	62.00	
Taldeo <i>I4</i>	58.50	59.00	59.50	59.50	
Trey, N. Y. <i>R3</i>	60.50	61.00	61.50	62.00	66.50
Youngstown <i>Y1</i>			59.00	59.50	

Product	381	382	393	394	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	48.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	68.75	45.25	68.00	38.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	40.25	64.75	31.75	33.00	32.25
Sheets	44.25	44.50	—	47.25	68.25	54.25	73.50	26.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25*	58.25	44.25	59.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	26.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeepport, Pa., U1; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4; Philadelphia, D5.

Strip, Midland, Pa., C/I; Cleveland, A/S; Carnegie, Pa., S/S; McKeesport, Pa., F/I; Reading, Pa., C/I; Washington, Pa., W/Z; Lacledeburg, Pa., A/I; Bridgeville, Pa., U/I; Detroit, M/Z; Canton-Massillon, O., R/Z; Middletown, O., A/I; Harrison, N. J., D/Z; Youngstown, C/I; Sharon, Pa., S/I; Butler, Pa., A/I; Wallingford, Conn., U/J (2½ per lb higher); WI (2½ per lb higher); New Bedford, Mass., A/I.

Ber: Baltimore, *A7*; Duquesne, *Pa.*, *U1*; Muncie, *Pa.*, *U1*; Reading, *Pa.*, *C7*; Titusville, *Pa.*, *U2*; Washington, *Pa.*, *J2*; McKeesport, *Pa.*, *U1*; *F1*; Bridgeville, *Pa.*, *U2*; Dunkirk, *N. Y.*, *A3*; Massillon, *O.*, *R3*; Chicago, *U1*; Syracuse, *N. Y.*, *C11*; Watervliet, *N. Y.*, *A3*; Waukegan, *A3*; Canton, *O.*, *T1*; Ft. Wayne, *Ind.*; Philadelphia, *D3*; Detroit, *R3*.

WILL: Waukegan, IL; Massillon, OH; McKeesport, PA; Ft. Wayne, IN; Harrison, N. J.; D; Baltimore, MD; Dunkirk, NY; Moneaen, PI; Syracuse, NY; Bridgeville, U2.

Plates: Brackenridge, Pa., A1; Chicago, U1; Munkell, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown,

Forged disco, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C12*; Fernand, Mich., *A3*; Washington, Pa., *J2*.
Frosted killer, *M1-12*; *R-1*; *C11*; *R-12*; *S-1*; *S-2*; *R-13*; *M-1*; *R-14*; *M-2*; *M-3*; *M-4*; *M-5*.

Forgings Shipped: Midland, Pa., 111; Baltimore, Md.; Washington, Pa., 11; McKeesport, Pa.; Masontown, Canton, O., 10; Waterbury, Conn.; Pittsburgh, Chicago, Ill.; Syracuse, N.Y.; Detroit, Mich.

November 24, 1955

Prices On The Move Again

Philadelphia joins Chicago in upward climb . . . May be only the beginning . . . Weather a factor . . . Pittsburgh still lags . . . Composite up 66¢.

♦ **PHILADELPHIA**, New York, and midwest markets report No. 1 heavy melting up this week.

Advance marks the first broad market movement in weeks and may mean a new price surge.

For some time there has been talk of gathering strength and an impending scrap pinch. The weather has turned cold. Mill operations continue at high rates. The market may be ready for a show of price strength.

In Chicago they are talking about further price increases in the near future. In Philadelphia, some dealers are saying winter weather will offset any price increases and keep the flow of scrap from exceeding current rates.

Pittsburgh reports lagging activity and holding prices.

Reflecting price advances in Chicago and the East, THE IRON AGE Composite for No. 1 heavy melting moved up 66¢ to \$45.83.

The National Federation of Independent Scrap Yard Dealers, Inc., has told the Office of Defense Mobilization that the nation's annual scrap potential is sufficient to take care of the open market scrap needs of our expanding steel industry.

Pittsburgh . . . There is little change in the local scrap market. Major mills in the area have been talking to brokers and a few feelers are out, but no purchases are reported. Dealers report scrap moving into their yards is slowing down. Brokers are finding it increasingly difficult to fill orders for low phosphorus scrap at current prices. Grades of railroad and cast scrap maintain their strong market position as foundry activity flourishes. While general market activity is below normal, most quarters look for a substantial increase in scrap transactions.

Chicago . . . In a market confused by small tonnage purchases of new material at old prices, Chicago scrap prices nonetheless continued their advance of last week. Broker buying advanced to \$44 and even \$45 on No. 1 heavy melting. Heavy trading between brokers was the rule all through the week, and the general market tone indicated strong possibilities of further price increases in the near future. At press time turnings grades remained unaffected but there are indications that this grade will also share in the general market surge. Railroad continues the "hottest" item, with reroller rails particularly active and with railroad list prices on random length rail continuing to show strong advances.

Philadelphia . . . Several mills in the district have upped their buying price for open hearth grades \$1 a ton. Blast furnace grades show a new topside level of \$31, up \$1.50 over last week's list. Cast grades moved up on new purchases.

New York . . . Steelmaking grades have risen \$1 to \$43.50 per ton for No. 1 heavy melting steel on the basis of confirmed sales. Cast grades moved up \$1 on buying by a leading eastern mill.

Detroit . . . The Detroit market was marking time this week waiting for the December lists to close. Indications are that prices will maintain their present strength, with a possibility that they may go a little higher. Reasons behind the prediction are the continuing high operating rate at the mills coupled with the closing of the water shipping season.

Cleveland . . . Valley price on steelmaking grades went up 50 cents last week on purchase by consumer there and Cleveland price rose in sympathy. Consumer bought industrial scrap direct at \$50 for a top grade, dealer scrap at \$49 and sheet clips for baling at mill. Brokers expect some difficulty

in obtaining scrap because some dealers are holding out for usual year-end tax reasons. Other mills in Valley are trying to buy at lower prices. Cleveland foundry market continues strong at this month's prices.

Birmingham . . . The scrap market continues strong with electric furnace items continuing to command higher prices on almost every purchase. Steel mills, with sizable inventories, are resisting increases in prices. Dealers, on the other hand, are declining to deliver scrap at present market prices, with the result that little open-hearth scrap is moving in the district. Some foundries are reported trying to buy cast above the market, but are not having much success, and these prices are unchanged. The majority of cast consumers, however, are steadfastly holding the price line, preferring to use more pig iron.

St. Louis . . . Steel mills continue to take all scrap offerings which have been equal to the melt, weather conditions being satisfactory so far for collecting and processing. A strong demand from foundries has strengthened the items which they require, and railroad specialties and steel car axles are the latest to advance, being \$3 higher. Other prices remain unchanged. Price of locomotive tires is \$53 to \$54. This item was incorrectly listed at \$60.

Cincinnati . . . Expected drainage of local scrap to Pittsburgh by barge is materializing this week at up to \$48 delivered Pittsburgh. This equals about \$42 broker buying in Cincinnati or within quoted limits. Brokers and dealers see little possibility of local mill raising local prices for material to avoid setting a precedent if nothing else. Foundry market very strong with general \$2 increase on basis of end-of-week sales. Overall outlook for December continued strong.

Buffalo . . . Low phosphorus plate is up \$1; rails two feet and under are up \$2. Otherwise the market here is unchanged. The area's biggest buyer has yet to come in for expected purchases.

Boston . . . No. 1 heavy melting is off \$1 in a Boston market that shows no definite trend, up or down. Most buying is for eastern Pennsylvania mills with a little Pittsburgh activity.

West Coast . . . All quiet on the western front. Mills seem to be getting what they need. There's a lull in San Francisco exporting and temporary tapering in Los Angeles.

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OF
LEADERSHIP
IN
IRON & STEEL
SCRAP
SINCE
1889



Luria Brothers and Company, Inc.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.

Philadelphia 7, Penna.

PLANTS

LEBANON, PENNA. DETROIT (ECORSE).
READING, PENNA. MICHIGAN
MODENA, PENNA. PITTSBURGH, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.	DETROIT, MICHIGAN	PITTSBURGH, PENNA.
BOSTON, MASS.	HOUSTON, TEXAS	PUEBLO, COLORADO
BUFFALO, N. Y.	LEBANON, PENNA.	READING, PENNA.
CHICAGO, ILLINOIS	LOS ANGELES, CAL.	ST. LOUIS, MO.
CLEVELAND, OHIO	NEW YORK, N. Y.	SANFRANCISCO, CAL.
		SEATTLE, WASH.

EXPORTS - IMPORTS — LIVINGSTON & SOUTHDARD, INC., 99 Park Avenue, New York, N. Y. Cable Address: FORENTRACO

Scrap Prices (Effective Nov. 22, 1955)

Pittsburgh

No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	39.00 to 49.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and ms. turns.	30.00 to 31.00
Shoveling turnings	32.00 to 34.00
Cast iron borings	32.00 to 34.00
Low phos. punch'gs. plate	49.00 to 50.00
Heavy turnings	42.00 to 42.00
No. 1 RR. hvy. melting	43.00 to 49.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	59.00 to 60.00
RR. steel wheels	54.00 to 55.00
RR. spring steel	54.00 to 55.00
RR. couplers and knuckles	54.00 to 55.00
No. 1 machinery cast	52.00 to 53.00
Cupola cast	42.00 to 42.00
Heavy breakable cast	43.00 to 44.00

Chicago

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 factory bundles	47.00 to 48.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	35.00 to 35.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. forge crops	52.00 to 54.00
Low phos. punch'gs. plate	50.00 to 51.00
Low phos. 2 ft and under	49.00 to 50.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	58.00 to 59.00
Rerolling rails	68.00 to 70.00
Rails 2 ft and under	63.00 to 64.00
Locomotive tires, cut	52.00 to 54.00
Cut boasters & side frames	54.00 to 56.00
RR. steel car axles	60.00 to 61.00
RR. couplers and knuckles	54.00 to 55.00
No. 1 machinery cast	54.00 to 55.00
Cupola cast	50.00 to 51.00
Heavy breakable cast	42.00 to 43.00
Cast iron brake shoes	39.00 to 40.00
Cast iron car wheels	48.00 to 49.00
Malleable	58.00 to 59.00
Stove plate	41.00 to 42.00

Philadelphia Area

No. 1 hvy. melting	\$47.00 to \$48.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	47.00 to 48.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	20.00 to 31.00
Mixed bor. short turn.	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Shoveling turnings	22.00 to 33.00
Clean cast chem. borings	25.00 to 36.00
Low phos. 5 ft and under	49.00 to 50.00
Low phos. 2 ft and under	50.00 to 51.00
Low phos. punch'gs. plate	50.00 to 51.00
Elec. furnace bundles	48.00 to 49.00
Heavy turnings	43.00 to 44.00
RR. steel wheels	52.00 to 53.00
RR. spring steel	52.00 to 53.00
Rails 18 in. and under	59.00 to 60.00
Cupola cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Cast iron car wheels	52.00 to 53.00
Malleable	60.00 to 61.00
Unstripped motor blocks	29.00 to 31.00
No. 1 machinery cast	52.00 to 53.00

Cleveland

No. 1 hvy. melting	\$45.50 to \$46.50
No. 2 hvy. melting	39.50 to 40.50
No. 1 bundles	45.50 to 46.50
No. 2 bundles	36.50 to 27.50
No. 1 busheling	45.50 to 46.50
Machine shop turn.	21.00 to 26.00
Mixed bor. and turn.	26.50 to 29.50
Shoveling turnings	26.50 to 29.50
Cast iron borings	26.50 to 29.50
Cut struc'tl & plates, 2 ft & under	51.00 to 52.00
Drop forge flashings	44.00 to 45.00
Low phos. punch'gs. plate	46.50 to 47.50
Foundry steel, 3 ft & under	50.00 to 51.00
No. 1 RR. heavy melting	48.50 to 49.50
Rails 2 ft and under	61.00 to 62.00
Rails 18 in. and under	62.00 to 63.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	30.00 to 31.00
Railroad cast.	49.00 to 50.00
No. 1 machinery cast	49.00 to 50.00
Stove plate	45.00 to 46.00
Malleable	51.00 to 52.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$48.00 to \$49.00
No. 2 hvy. melting	41.50 to 42.50
No. 1 bundles	48.00 to 49.00
No. 2 bundles	36.50 to 37.50
Machine shop turn.	27.50 to 28.50
Shoveling turnings	31.50 to 32.50
Cast iron borings	31.50 to 32.50
Low phos. plate	49.00 to 50.00

Buffalo

No. 1 hvy. melting	\$41.00 to \$42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 busheling	41.00 to 42.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	46.00 to 47.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	54.00 to 55.00
RR. steel wheels	48.00 to 49.00
RR. spring steel	48.00 to 49.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast	43.00 to 44.00
No. 1 cupola cast	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$39.50 to \$40.50
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	39.50 to 40.50
No. 2 bundles	27.00 to 28.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	29.00 to 30.00
Cast iron borings	25.00 to 26.00
Low phos. 18 in. & under	52.00 to 53.00
Rails, random lengths	55.00 to 56.00
Rails, 18 in. and under	62.00 to 63.00
No. 1 cupola cast	44.00 to 45.00
Hvy. breakable cast	42.00 to 43.00
Drop broken cast	52.00 to 53.00

St. Louis

No. 1 hvy. melting	\$38.50 to \$39.50
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	31.50 to 32.50
Machine shop turn.	27.00 to 28.00
Shoveling turnings	28.00 to 29.00
No. 1 RR. hvy. melting	46.00 to 47.00
Rails, random lengths	52.00 to 53.00
Rails, 18 in. and under	59.00 to 60.00
Locomotive tires uncut	53.00 to 54.00
Angles and splice bars	53.00 to 54.00
Std. steel car axles	49.00 to 50.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	35.00 to 36.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	47.00 to 48.00
Malleable	48.00 to 49.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	32.00 to 33.50
No. 1 bundles	38.00 to 39.00
No. 2 bundles	28.00 to 28.50
No. 1 busheling	37.00 to 38.00
Elec. furnace, 3 ft & under	39.00 to 40.00
Machine shop turn.	21.00 to 21.50
Mixed bor. and short turn.	22.00 to 23.00
Shoveling turnings	24.00 to 25.00
Clean cast chem. borings	23.00 to 24.00
No. 1 machinery cast	37.00 to 38.00
Mixed cupola cast	33.00 to 34.00
Heavy breakable cast	34.50 to 35.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$42.50 to \$42.50
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	33.00 to 34.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	24.00 to 25.00
No. 1 machinery cast	40.00 to 41.00
Mixed yard cast	38.00 to 40.00
Charging box cast	40.00 to 41.00
Heavy breakable cast	40.00 to 41.00
Unstripped motor blocks	26.00 to 27.00

Birmingham

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	25.00 to 26.00
Low phos. 18 in. & under	52.00 to 53.00
Rails, random lengths	55.00 to 56.00
Rails, 18 in. and under	62.00 to 63.00
No. 1 cupola cast	44.00 to 45.00
Hvy. breakable cast	42.00 to 43.00
Drop broken cast	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 bundles	42.00 to 43.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	23.00 to 30.00
Cast iron borings	25.00 to 26.00
Low phos. 18 in. & under	52.00 to 53.00
Rails, random lengths	55.00 to 56.00
Rails, 18 in. and under	62.00 to 63.00
No. 1 cupola cast	44.00 to 45.00
Hvy. breakable cast	42.00 to 43.00
Drop broken cast	52.00 to 53.00

San Francisco

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	38.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turn.	27.00
Shoveling turnings	28.00
Cast iron borings	18.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast	45.00

Los Angeles

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turn.	27.00
Shoveling turnings	28.00
Cast iron borings	18.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast	45.00

Seattle

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	34.00
No. 2 bundles	30.00
No. 1 cupola cast	40.00
Mixed yard cast	40.00

Hamilton, Ont.

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$38.50
No. 2 hvy. melting	35.50</



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OHIO MAGNETS

Size for size, Ohio Magnets lift larger loads over longer periods because they *operate cooler*. So for extra magnet lifting power, extra magnet value—always specify Ohio Magnets and Ohio Magnet Controllers. There's a type and size for every lifting job. Send for free copy of Bulletin 112, or consult the Yellow Pages for Ohio offices in principal cities.

AA-1477

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Copper, Aluminum Output Up

October production record . . . Aluminum output up by 8 million lb . . . Fourth quarter sure record . . . Domestic and foreign copper production both rise.

♦ OUTPUT OF BOTH aluminum and copper set new records in October. Record production in both cases was clearly due to unprecedented demand by civilian industrial customers.

Domestic aluminum production in October was 269,312,211 lb, over eight million lb better than the month before, and more than 19 million lb over October 1954, the Aluminum Assn. reports.

Total for the first 10 months of this year is 2,582,695,203 lb compared with 2,424,557,637 lb for the same period in 1954, the previous record year. At the current rate—there is no foreseeable reason why it will not be maintained—output in the fourth quarter should pass the present quarterly record of 793,649,982 lb, set in third quarter of this year.

Crude primary copper output, both domestic and foreign, set new records in October, according to the Copper Institute. Domestic crude output was 100,208 net tons, compared to 96,343 tons in September. Foreign crude output, excluding Russia, Yugoslavia, Norway, Sweden, Japan and Australia, was 145,462 tons for October, compared with 140,606 tons the month before. Total production was 245,670 tons.

Domestic production of crude

primary and secondary copper combined totaled 110,071 tons, a new high for the industry.

Total deliveries, however, were 246,898 tons, slightly under the 262,118 tons shipped in September. In this country, October deliveries were 133,946 tons, down from 144,571 tons the month before. Production seems to be catching up with deliveries. There is, however, still considerable distance between demand and supply. Copper executives are now tending to blame this more and more exclusively on supply pipelines emptied by strikes in recent months.

In the interim, however, demand is strong and growing stronger almost daily. Custom smelters have raised their prices $\frac{1}{2}$ cent a lb to 46 cents per lb for December delivery. Refiners, having recently raised scrap prices to 38½ cents per lb in an almost fruitless attempt to draw out more material, have now concluded there just isn't any more scrap metal to speak of. They are now standing pat at current prices.

COPPER . . . The government is increasing the percentage of mill space to be reserved for production of copper-base controlled metal for military and atomic energy orders in the first quarter of 1956.

Increasing military needs for cop-

per will bring total first quarter reserves of copper-base products to 116 million lb., an increase of 8 million lb. over the take for third and fourth quarters of this year. This total includes set asides for defense-related "B" products as well as military and AEC demands.

Mill space set asides for most types of products will be increased in the January-March period. Only decreases in the take are unalloyed rod, bar, shapes and wire, decreased from 11 to 9 pct, semi-unalloyed seamless tube and pipe from 6 to 5 pct, semi-copper foundry products reserves from 9 to 8 pct, and copper-base powder mill products, which have been dropped from the list.

Increases in set asides include alloyed brass mill plate, sheet, strip and rolls from 6 to 8 pct, semi rod, bar, shapes and wire from 5 to 10 pct, semi alloyed seamless tube and pipe unchanged at 20 pct, semi-unalloyed brass mill plate, sheet, strip and rolls unchanged at 8 pct, semi copper wire and cable from 8 to 10 pct.

NICKEL . . . The government wants a full report on how nickel is being used. All rate orders placed for November melting or processing of nickel are being checked to determine whether users of the scarce metal are abusing defense ratings.

Report is being made by Commerce Dept's Business and Defense Services Administration.

The investigation was instigated by Office of Defense Mobilization, and follows diversion of nickel to industry from government stockpiles deliveries. Letters have been sent to all melters and processors of nickel asking for detailed data on all defense-rate orders for nickel-bearing materials placed for production this month. Answers are due by December 1.

Information requested includes customer name; order numbers; defense contract numbers; defense order ratings; products; grades; percent content; shipped weight of product; nickel ordered from nickel supplier on defense rating.

Answers to the questions, by law, may not be divulged except to mobilization officials.

Making a wilfully false statement or representation to any government agency is of course contrary to law. But BDSA says that in recent months there have been some instances of incorrect defense order identification in extending defense order ratings upon suppliers.

The agency says it will have its legal staff study probe results.

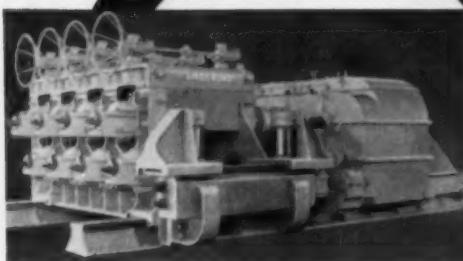
Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Nov. 16	Nov. 17	Nov. 18	Nov. 19	Nov. 21	Nov. 22
Copper, electro, Conn.	43.00	43.00	43.00	43.00	43.00	43.00
Copper, Lake, delivered	43.00	43.00	43.00	43.00	43.00	43.00
Tin, Straits, New York	98.625	99.00	98.875	...	98.875	98.875*
Zinc, East St. Louis	13.00	13.00	13.00	13.00	13.00	13.00
Lead, St. Louis	15.30	15.30	15.30	15.30	15.30	15.30

Note: Quotations are going prices

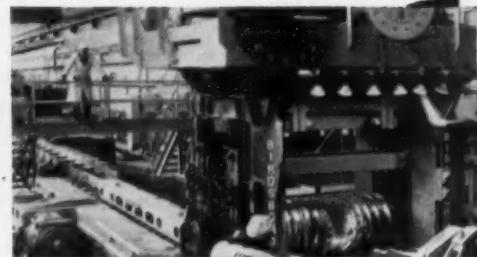
*Tentative



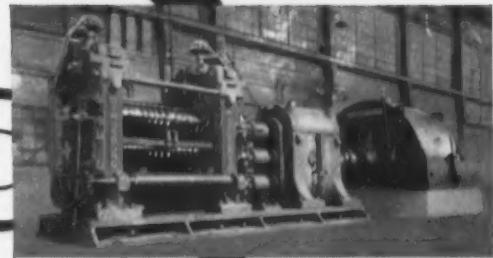
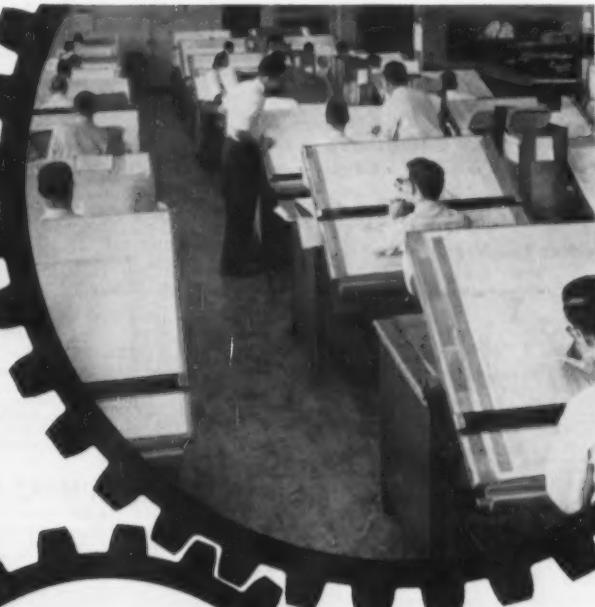
Straightener



2-Strand Flying Shears



Primary Mill



18" Roughing Mill

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ROLLS: Steel, Alloy Iron, Alloy Steel

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BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

Nonferrous Prices (Effective Nov. 22, 1955)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 20,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate ("F" temper except 6061-0)

Alloy	.032	.081	136-249	250-3
1100, 3003	40.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	41.6-43.2	56.6-60.2
12-14	42.3-43.7	57.5-61.8
24-26	45.3-45.7	67.7-72.1
36-38	53.6-54.2	90.5-94.3

Screw Machine Stock—2011-T-3

Size*	1/4	3/8-5/8	5/8-1	1 1/4-1 1/2
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length" →	72	96	120	144
.010 gage	\$1.295	\$1.727	\$2.160	\$2.590
.024 gage	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FSB-O 1/4 in., 61¢; 8/16 in., 62¢; 1/8 in., 61¢; 0.064 in., 78¢; 0.052 in., 99¢. Specification grade higher. Base, \$0.000 lb.

Extruded Round Rod: FS, diam 1/4 to 0.311 in., 82.5¢; 1/2 to 5 in., 65¢; 1/4 to 1.749 in., 60.5¢; 2 1/2 to 5 in., 87¢. Other alloys higher. Base up to 1/2 in., 10,000 lb; 1/2 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 5.5 in., 70.7¢; 0.22 to 0.25 lb, 6.5 in., 66¢; 0.50 to 0.59 lb, 8.6 in., 68¢; 1.8 to 2.59 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 87.7¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness; OD 1/4 to 5/16 in., \$1.625; 5/16 to 1/2 in., \$1.475; 1/2 to 5 in., \$1.195; 1 to 2 in., 92.5¢; 0.165 to 0.319 in. wall; OD 1/4 to 5/16 in., 75.5¢; 1 to 2 in., 71.5¢; 2 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1/2 in., 10,000 lb; 1/2 to 5 in., 20,000 lb; over 5 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Shapes
Copper	62.13	...	...
Copper, b-r	58.76	55.11	...
Copper, drawn	...	60.36	...
Low brass	56.55	56.09	...
Yellow brass	52.27	52.21	...
Tin brass	58.09	58.03	...
Naval brass	52.83	47.14	48.40
Leaded brass	...	...	45.74
Com. bronze	60.18	60.12	...
Mang. bronze	59.39	63.41	52.23
Phos. bronze	81.00	81.50	...
Muntz metal	52.74	49.55	48.00
Ni silver, 10 pct	66.00	...	68.50
Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.	...	...	...
Strip	...	...	\$1.84
Rod, bar, wire	...	...	1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

"A" Nickel	Monel	Inconel
Sheet, CR	102	99
Strip, CR	102	92
Rod, Bar, HR	87	74
Angles, HR	87	74
Plate, HR	97	87
Seamless Tube	122	110
Shot, Blocks	...	71

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$14.00-\$14.50; alloy \$16.50; Plate, HR, commercially pure, \$11.50-\$12.00; alloy, \$12.50-\$12.75. Wire, rolled and/or drawn, commercially pure, \$10.50-\$11.00; alloy, \$12.50; Bar, HR or forged, commercially pure, \$8.50-\$8.75; alloy, \$8.50-\$9.00.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 24.40
Aluminum pig 22.50
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb cont'd'd Be \$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be \$72.75

Bismuth, ton lots \$2.25

Cadmium, del'd \$1.70

Cobalt, 97-99% (per lb) \$2.60 to \$2.67

Copper, electro, Conn. Valley 43.00

Copper, Lake, delivered 43.00

Gold, U. S. Treas., per troy oz. \$25.00

Indium, 99.9%, dollars per troy oz. \$2.25

Iridium, dollars per troy oz. \$100 to \$120

Lead, St. Louis 15.30

Lead, New York 15.50

Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig \$2.50

Magnesium, 100% \$3.25

Magnesium, sticks, 100 to 500 lb \$3.00

Mercury, dollars per 76-lb flask, f.o.b. New York \$280 to \$285

Nickel electro 64.50

Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75

Palladium, dollars per troy oz. \$22.20 to \$24

Platinum, dollars per troy oz. \$97 to \$99

Silver, New York, cents per troy oz. 91.625

Tin, New York 98.875¢

Titanium, sponge, grade A-1 \$3.75

Zinc, East St. Louis 13.00

Zinc, New York 13.50

Zirconium, sponge \$10.00

* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	No. 115	41.00
No. 126	40.50	
No. 133	40.00	
80-10-10 ingot	No. 205	44.75
No. 315	43.00	
88-10-2 ingot	No. 210	56.25
No. 215	52.75	
No. 245	47.25	
Yellow ingot	No. 405	32.75
	No. 421	36.25

Aluminum Ingot

(Cents per lb del'd 20,000 lb and over)

95-5 aluminum-silicon alloys	32.00-32.75
0.60 copper max.	31.75-32.50
Piston alloys (No. 122 type)	32.75-33.75
No. 12 alum. (No. 2 grade)	30.00-30.75
108 alloy	30.00-30.50
198 alloy	32.00-32.75
13 alloy (0.60 copper max.)	31.75-32.50
AXS-679	30.00-30.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—85-87 1/2% \$1.00-\$2.00

Grade 2—92-95% \$0.00-\$1.00

Grade 3—96-98% \$0.00-\$0.00

Grade 4—85-90% \$0.00-\$2.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)	Heavy	Turnings
Copper	39	38 1/2
Yellow brass	28 1/2	26 1/2
Red brass	34 1/2	33 1/2
Comm. bronze	35 1/2	35
Mang. bronze	26 1/2	26
Yellow brass rod ends	28 1/2	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)
No. 1 copper wire
No. 2 copper wire
Light copper
No. 1 composition
No. 1 comp. turnings
Hvy. yellow brass solids
Brass pipe
Radiators

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)
No. 1 copper wire
No. 2 copper wire
Light copper
No. 1 composition
No. 1 comp. turnings
Hvy. yellow brass solids
Brass pipe
Radiators

Copper and Brass

No. 1 heavy copper and wire	36 1/2-37
No. 2 heavy copper and wire	35-36
Light copper	33-33 1/2
New type shell cuttings	33-33 1/2
Auto radiators (unsweated)	23 1/2-24
No. 1 composition	23 1/2-30
No. 1 composition turnings	27-27 1/2
Unlined red car boxes	23 1/2-24
Cocks and faucets	23 1/2-24
Clear heavy yellow brass	18 1/2-19
Brass pipe	24 1/2-25
New soft brass clippings	24-24 1/2
No. 1 brass rod turnings	22-22 1/2

Aluminum

Alum. pistons and struts	16 1/2-17
Aluminum crankcases	16 1/2-17 1/2
1100 (28) aluminum clippings	19 1/2
Old sheet and utensils	16 1/2-17 1/2
Borings and turnings	11-11 1/2
Industrial castings	16 1/2-17 1/2
2024 (24s) clippings	18-18 1/2

Zinc

New zinc clippings	8-8 1/2
Old zinc	5 1/2-6
Zinc routings	4
Old die cast scrap	3 1/2

Nickel and Monel

Pure nickel clippings	125
Clean nickel turnings	100
Nickel anodes	125
Nickel rod ends	125
New Monel clippings	54 1/2
Clean Monel turnings	44
Old sheet Monel	50
Nickel silver clippings, mixed	23
Nickel silver turnings, mixed	19

Lead

Soft scrap lead	12-12 1/2
Battery plates (dry)	6 1/2-6 1/4
Batteries, acid free	4 1/2

Magnesium

Segregated solids	18 1/2-19
Castings	17 1/2-18

Miscellaneous

Block tin	80-81
No. 1 pewter	63-64
Auto babbitt	42-43
Mixed common babbitt	14 1/2
Solder joints	19 1/2-20
Siphon tops	43
Small found	

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.													
STEEL PRICES <i>(Effective Nov. 22, 1955)</i>		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP						
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hat-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled	
EAST	Bethlehem, Pa.			\$96.00 B3		4.65 B3	6.80 B3	4.65 B3							
	Buffalo, N. Y.	\$88.50 B3	\$84.50 R3, B3	\$96.00 R3, B3	5.45 B3	4.65 B3	6.80 B3	4.65 B3	4.325 R3, B3	6.25 B3 6.25 R7, S10	6.425 B3	9.10 B3			
	Claymont, Del.														
	Harrison, N. J.													13.45 C1F	
	Conshohocken, Pa.									4.375 A2	6.30 A2	6.425 A2			
	New Bedford, Mass.										6.70 R6				
	Johnstown, Pa.	\$88.50 B3	\$84.50 B3	\$96.00 B3		4.65 B3	6.80 B3								
	Boston, Mass.										6.80 T8			13.80 T8	
	New Haven, Conn.										6.70 D1 7.00 A5				
	Phoenixville, Pa.					5.15 P2		5.15 P2							
	Sparrows Pt., Md.									4.325 B3	6.25 B3	6.425 B3	9.10 B3		
	Bridgeport, Wallingford, Conn.	\$73.50 N8	\$89.50 N8							6.825 N8	6.70 W7			7.50 N8	
	Pawtucket, R. I. Worcester, Mass.										80 N7 .8 A5			13.80 N7 A5	
MIDDLE WEST	Alton, Ill.									4.50 L1					
	Ashland, Ky.									4.325 A7					
	Canton-Massillon, Dever, Ohio		\$86.50 R3	\$96.00 R3										13.45 G4	
	Chicago, Ill.	\$88.50 U1	\$84.50 R3, U1,W8	\$96.00 R3, U1,W8	5.45 U1	4.60 U1, W8	6.75 U1, Y1	4.60 U1	4.55 A1 4.325 N4,W8	6.35 A1,T8				7.20 W8	13.45 T8
	Cleveland, Ohio										6.25 A5,J3		9.30 A5		13.45 A5
	Detroit, Mich.			\$96.00 R5						4.425 G3,M7	6.35 D1,D2, G3,M2,P11	6.325 G3	9.20 D2, G3		
	Duluth, Minn.														
	Gary, Ind. Harbor, Indiana	\$88.50 U1	\$84.50 U1	\$96.00 U1, Y1	5.45 J3	4.60 U1, J3	6.75 U1, J3			4.325 J3, U1,Y1	6.35 J3 6.25 Y1	6.425 J3, U1,Y1	9.30 Y1, U1		
	Sterling, Ill.									4.425 N4					
	Indianapolis, Ind.										6.40 C5				
	Newport, Ky.													7.20 N5	
	Middletown, Ohio										6.45 A7				
	Niles, Warren, Ohio Sharon, Pa.	\$88.50 C10	\$84.50 C10	\$96.00 C10						4.325 S1, R3	6.25 S1, R3,T4	6.425 S1, R3	9.10 S1, R3	7.20 S1	13.45 S1
WEST	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$88.50 U1, J3	\$84.50 J3, U1,C11	\$96.00 U1, C11	5.45 U1	4.60 U1, J3	6.75 U1, J3	4.60 U1	4.325 P6	6.25 S7,B4				7.20 S9	13.45 S9
	Portsmouth, Ohio									4.325 P7	6.25 P7				
	Weirton, Wheeling, Fellowsbee, W. Va.						4.60 W3			4.325 W3	6.25 F3,W3	6.425 W3	9.10 W3		
	Youngstown, Ohio		\$84.50 C10	\$96.00 Y1, C10			4.60 Y1	6.75 Y1		4.325 U1, Y1	6.25 Y1,C5	6.425 U1, Y1	9.30 Y1	7.20 U1, Y1	13.45 C5
	Fontana, Cal.	\$76.00 K1	\$92.00 K1	\$115.00 K1		5.25 K1	7.40 K1	5.40 K1	5.975 K1	8.00 K1	7.325 K1			8.85 K1	
	Geneva, Utah		\$84.50 C7			4.60 C7	6.75 C7								
	Kansas City, Mo.					4.70 S2	6.85 S2				6.675 S2			7.45 S2	
	Los Angeles, Torrance, Cal.		\$94.00 B2	\$116.00 B2		5.30 C7, B2	7.45 B2		5.975 C7, B2	8.30 C7				8.40 B2	
	Minnequa, Colo.					4.90 C6				5.425 C6					
	Portland, Ore.					5.35 O2									
SOUTH	San Francisco, Niles, Pittsburg, Cal.		\$94.00 B2			5.25 B2, P9	7.40 B2		5.975 B2, C7						
	Seattle, Wash.		\$98.00 B2			5.35 B2	7.50 B2		5.325 B2						
	Atlanta, Ga.								4.525 A8						
	Fairfield, Ala. City, Birmingham, Ala.	\$88.50 T2	\$84.50 T2			4.60 C16, R3,T2	6.75 T2		4.325 R3, C16,T2		6.425 T2				
	Houston, Lone Star, Tex.	\$74.50 L3	\$89.50 S2	\$101.00 S2		4.70 S2	6.85 S2				6.675 S2		7.45 S2		

IRON AGE STEEL PRICES <small>(Effective Nov. 22, 1965)</small>		Prices identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.									WIRE ROD	TINPLATE†	BLACK PLATE		
		SHEETS													
		Hot-rolled 18 ga. & heavier	Cold- rolled	Galvanized 18 ga.	Enamel- ing 13 ga.	Long Tensile 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.	
EAST	Bethlehem, Pa.														
	Buffalo, N. Y.	4.325 B3	5.325 B3				6.375 B3	7.875 B3				W6			
	Claymont, Del.														
	Coopersburg, Pa.														
	Conshohocken, Pa.	4.375 A2	5.375 A2				6.425 A2								
	Harrisburg, Pa.														
	Hartford, Conn.														
	Johnstown, Pa.														
	Fairless, Pa.	4.375 U1	5.375 U1				6.425 U1	7.825 U1					\$9.30 U1	\$8.80 U1	
	New Haven, Conn.														
	Phoenixville, Pa.														
	Sparrows Pt., Md.	4.325 B3	5.325 B3	5.85 B3			6.375 B3	7.875 B3	8.60 B3			5.125 B3	\$9.30 B3	\$8.80 B3	
	Worcester, Mass.												5.325 A5		
	Trenton, N. J.														
MIDDLE WEST	Alton, Ill.											5.20 L1			
	Ashland, Ky.	4.325 A7		5.85 A7	5.90 A7										
	Canton-Massillon, Dover, Ohio			5.85 R1, R3											
	Chicago, Joliet, Ill.	4.55 A1 4.325 W8					6.375 U1					5.825 A5, N4, R3			
	Sterling, Ill.											5.125 N4			
	Cleveland, Ohio	4.225 J3, R3	5.225 J3, R3		5.90 R3		6.375 J3, R3	7.875 J3, R3				5.825 A5			
	Detroit, Mich.	4.425 G3, M2	5.425 G3 5.325 M2				6.475 G3	7.975 G3							
	Newport, Ky.	4.325 N5	5.325 N5	5.85 N5											
	Gary, Ind. Harbor, Indiana	4.325 J3, U1, Y1	5.325 J3, U1, Y1	5.85 U1, J3	5.90 U1, J3	6.25 U1	6.375 Y1, U1, J3	7.875 U1, Y1				5.825 Y1	\$9.20 J3, U1, Y1	\$7.90 J3, U1, Y1	
	Grande City, Ill.	4.825 G7	5.825 G7	6.86 G7	8.10 G7									\$8.80 G2	6.75 G3
	Kokomo, Ind.	4.425 C9		5.88 C9								5.475 C9	5.125 C9		
	Mansfield, Ohio	4.325 E2	5.325 E2			8.25 E2						E2			
	Middletown, Ohio		5.325 A7	5.85 A7	5.90 A7	6.25 A7									
	Niles, Warren, Ohio Sharon, Pa.	4.325 S1, R3, N3	5.325 R3, N3	5.85 R3 6.85 N3	5.90 N3	6.25 N3	6.375 S1, R3	7.875 R3					\$9.20 R3	\$7.90 R3	
WEST	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 J3, U1, P6	5.325 J3, U1, P6	5.88 U1	5.90 U1, A7		6.375 J3, U1	7.875 U1	8.60 U1			5.825 A5, P6	\$9.20 J3, U1	\$7.90 J3, U1	
	Portsmouth, Ohio	4.325 P7	5.325 P7									5.825 P7			
	Weirton, Wheeling, Follensbee, W. Va.	4.325 W3, W5	5.325 W3, W5, F3	5.85 W3, W5		6.25 W3, W5	6.375 W3	7.875 W3					\$9.20 W3, W5	\$7.90 W3, W5	6.65 F3, W5
	Youngstown, Ohio	4.325 U1, Y1	5.325 Y1		5.90 Y1		6.375 U1, Y1	7.875 Y1				5.825 Y1			
	Fontana, Cal.	5.975 K1	6.425 K1				7.125 K1	8.975 K1							
	Genoa, Utah	4.425 C7													
	Kansas City, Mo.												5.275 S2		
	Los Angeles, Torrance, Cal.												5.825 R2		
	Minneapolis, Colo.												5.275 C6		
	San Francisco, Niles, Pittsburg, Cal.	5.825 C7	6.275 C7	6.80 C7									5.875 C7	5.825 C7	5.885 C7
SOUTH	Seattle, Wash.														
	Atlanta, Ga.														
	Fairfield, Ala. Alabama City, Ala.	4.325 R3, T2	5.325 T2	5.85 R3, T2			6.375 T2					5.825 R3, T2	\$9.30 T2	\$8.80 T2	
	Houston, Tex.												5.275 S2		

IRON AGE STEEL PRICES <i>(Effective Nov. 22, 1955)</i>		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
		BARS					PLATES				WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Flange Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.375 <i>B3</i>	7.425 <i>B3</i>	6.80 <i>B3</i>					
	Buffalo, N. Y.	4.65 <i>B3,R3</i>	4.65 <i>B3,R3</i>	5.95 <i>B3</i>	5.375 <i>B3,R3</i>	7.425 <i>B3,B5</i>	6.80 <i>B3</i>	4.50 <i>B3,R3</i>				6.25 <i>W6</i>
	Claymont, Del.							4.80 <i>C6</i>			8.30 <i>C6</i>	6.725 <i>C6</i>
	Coatesville, Pa.							4.80 <i>L6</i>			8.30 <i>L6</i>	6.725 <i>L6</i>
	Canonsburg, Pa.							4.80 <i>A3</i>	8.375 <i>A3</i>			6.725 <i>A3</i>
	Harrisburg, Pa.							8.10 <i>C3</i>	8.375 <i>C3</i>			
	Hartford, Conn.			6.40 <i>R3</i>		7.725 <i>R3</i>						
	Johnstown, Pa.	4.65 <i>B3</i>	4.65 <i>B3</i>		5.375 <i>B3</i>		6.80 <i>B3</i>	4.50 <i>B3</i>		8.30 <i>B3</i>	6.725 <i>B3</i>	6.25 <i>B3</i>
	Fairless, Pa.	4.80 <i>U1</i>	4.80 <i>U1</i>		5.725 <i>U1</i>							
	Newark, N. J.			6.35 <i>W10</i>		7.60 <i>W10</i>						
	Camden, N. J.			6.35 <i>P10</i>								
	Bridgeport, Putnam, Conn.	4.80 <i>N8</i>		6.45 <i>W10</i>	5.725 <i>N8</i>			4.750 <i>N8</i>				
	Sparrows Pt., Md.		4.65 <i>B3</i>					4.80 <i>B3</i>		8.30 <i>B3</i>	6.725 <i>B3</i>	6.35 <i>B3</i>
	Palmer, Worcester, Readville, Mass.			6.35 <i>W11</i> , 6.45 <i>B5,C14</i>		7.725 <i>A5,B5</i>		4.50 <i>R3</i>				6.55 <i>A5,W6</i>
	Spring City, Pa.			6.35 <i>K4</i>		7.60 <i>K4</i>						
	Alton, Ill.	4.85 <i>L1</i>										6.425 <i>L1</i>
	Ashland, Newport, Ky.							4.80 <i>A7,N9</i>		8.30 <i>N9</i>		
	Canton-Massillon, Mansfield, Ohio	4.75 <i>R3</i>		5.90 <i>R2,R3</i>	5.375 <i>R3,T3</i>	7.425 <i>R2,R3,T3</i>		4.50 <i>E2</i>				
MIDDLE WEST	Chicago, Joliet, Ill.	4.65 <i>U1,N4,W8,R3,P13</i>	4.65 <i>N6,R5,P13</i>	5.90 <i>A5,W10,W8,B5,L2</i>	5.375 <i>U1,R3,W8</i>	7.425 <i>A5,W8,W10,L2,B5</i>		4.50 <i>U1,W8,I3,A1,R3</i>	8.375 <i>U1</i>	8.30 <i>U1</i>	6.725 <i>U1</i>	6.25 <i>A5,R3,N4,W7</i>
	Cleveland, Ohio	4.65 <i>R3</i>	4.65 <i>R3</i>	5.90 <i>A5,C13</i>		7.425 <i>A5,C13</i>	6.80 <i>R3</i>	4.80 <i>J3,R3</i>	8.375 <i>J3</i>		8.725 <i>R3,J3</i>	6.25 <i>A5,C13</i>
	Detroit, Mich.	4.75 <i>G3</i>	4.75 <i>G3</i>	5.90 <i>R5</i> , 6.10 <i>B5,P8</i> , 6.15 <i>P3</i>	5.375 <i>R5</i> , 5.675 <i>G3</i>	7.425 <i>R5</i> , 7.625 <i>B5,P3,P8</i>	6.80 <i>G3</i>	4.80 <i>G3</i>			8.825 <i>G3</i>	
	Duluth, Minn.											6.25 <i>A5</i>
	Gary, Ind. Harbor, Crawfordsville, Ind.	4.65 <i>J3,U1,Y1</i>	4.65 <i>J3,U1,Y1</i>	5.90 <i>M5,R3</i>	5.375 <i>J3,U1,Y1</i>	7.425 <i>M5,R3</i>	6.80 <i>U1,J3,Y1</i>	4.50 <i>J3,U1,Y1</i>	8.375 <i>J3</i>	8.30 <i>U1,Y1</i>	6.725 <i>U1,J3,Y1</i>	6.35 <i>M4</i>
	Granite City, Ill.							4.70 <i>G3</i>				
	Kokomo, Ind.											6.35 <i>C9</i>
	Sterling, Ill.	4.75 <i>N4</i>	4.75 <i>N4</i>									6.35 <i>N4</i>
	Niles, Warren, Ohio Sharon, Pa.	4.65 <i>R3,C10</i>		5.90 <i>C10</i>	5.375 <i>C10</i>	7.425 <i>C10</i>	6.80 <i>R3</i>	4.50 <i>S1,R3</i>		8.30 <i>S1</i>	6.725 <i>S1</i>	
	Pittsburgh, Pa. Midland, Pa.	4.65 <i>J3,U1,C11</i>	4.65 <i>J3,U1</i>	5.90 <i>A5,C8,C11,J3,W10,B4,R3</i>	5.375 <i>U1,C11</i>	7.425 <i>A5,C11,W10,C8,R3</i>	6.80 <i>J3,U1</i>	4.50 <i>J3,U1</i>	8.375 <i>U1</i>	8.30 <i>U1</i>	6.725 <i>J3,U1</i>	6.25 <i>A5,J3,P6</i>
	Portsmouth, Ohio											6.25 <i>P7</i>
	Wirtown, Wheeling, Follansbee, W. Va.	4.65 <i>W3</i>						4.50 <i>W3,W3</i>				
	Youngstown, Ohio	4.65 <i>U1,Y1,C10,R3</i>	4.65 <i>U1,Y1,R3</i>	5.90 <i>Y1,U1</i>	5.375 <i>U1,Y1,C10</i>	7.425 <i>Y1,C10</i> , 7.665 <i>F2</i>	6.80 <i>U1,Y1</i>	4.50 <i>U1,Y1,R3</i>		8.30 <i>Y1</i>	6.725 <i>Y1</i>	6.25 <i>Y1</i>
	Emeryville, Cal.	5.40 <i>J5</i>	5.40 <i>J5</i>									
	Fontana, Cal.	5.35 <i>K1</i>	5.35 <i>K1</i>		6.825 <i>K1</i>		7.50 <i>K1</i>	5.15 <i>K1</i>		6.95 <i>K1</i>	7.375 <i>K1</i>	
	Geneva, Utah							4.80 <i>C7</i>				6.725 <i>C7</i>
	Kansas City, Mo.	4.90 <i>S2</i>	4.90 <i>S2</i>		5.825 <i>S2</i>		7.95 <i>S2</i>				6.50 <i>S2</i>	
	Los Angeles, Torrance, Cal.	5.35 <i>B2,C7</i>	5.35 <i>B2,C7</i>	7.35 <i>R3</i>	6.825 <i>B2</i>		7.50 <i>B2</i>				7.325 <i>B2</i>	
	Minnequa, Colo.	5.10 <i>C6</i>	5.10 <i>C6</i>					5.35 <i>C6</i>				6.50 <i>C6</i>
	Portland, Ore.	5.40 <i>O2</i>	5.40 <i>O2</i>									
	San Francisco, Niles, Pittsburgh, Cal.	5.35 <i>C7</i> , 5.40 <i>B2,P9</i>	5.35 <i>C7</i> , 5.40 <i>B2,P9</i>				7.55 <i>B2</i>				7.325 <i>C7</i>	
	Seattle, Wash.	5.40 <i>B2,P12,N5</i>	5.40 <i>B2,P12,N5</i>				7.55 <i>B2</i>	5.40 <i>B2</i>		7.30 <i>B2</i>	7.325 <i>B2</i>	
WEST	Atlanta, Ga.	4.85 <i>A8</i>	4.85 <i>A8</i>									6.45 <i>A8</i>
	Fairfield, Ala., City, Birmingham, Ala.	4.65 <i>T2,C16,R3</i>	4.65 <i>T2,C16,R3</i>				6.80 <i>T2</i>	4.80 <i>T2,R3</i>			6.725 <i>T2</i>	
	Houston, Ft. Worth, Lone Star, Tex.	4.90 <i>S2</i>	4.90 <i>S2</i>		5.825 <i>S2</i>		7.65 <i>S2</i>	4.80 <i>L3</i>		6.40 <i>S2</i>	6.825 <i>S2</i>	
							4.80 <i>S2</i>				6.50 <i>S2</i>	

Steel Prices (Effective Nov. 22, 1955)

Key to Steel Producers

With Principal Offices

- A** Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladstals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Biss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Celestrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kotsos, Ind.
C10 Copperwell Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Honey Dewitt & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.

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|-----|---|
| G7 | Granite City Steel Co., Granite City, Ill. |
| G3 | Great Lake Steel Corp., Detroit |
| Gf | Greer Steel Co., Dover, O. |
| H1 | Hanna Furnace Corp., Detroit |
| I2 | Ingersoll Steel Div., Chicago |
| I3 | Inland Steel Co., Chicago |
| I4 | Interlake Iron Corp., Cleveland |
| J1 | Jackson Iron & Steel Co., Jackson, O. |
| J2 | Jessop Steel Corp., Washington, Pa. |
| J3 | Jones & Laughlin Steel Corp., Pittsburgh |
| J4 | Joslyn Mfg. & Supply Co., Chicago |
| J5 | Judson Steel Corp., Emeryville, Calif. |
| K1 | Kaiser Steel Corp., Fontana, Cal. |
| K2 | Keystone Steel & Wire Co., Poria |
| K3 | Koppers Co., Granite City, Ill. |
| K4 | Keystone Drawn Steel Co., Spring City, Pa. |
| L1 | Laclede Steel Co., St. Louis |
| L2 | La Salle Steel Co., Chicago |
| L3 | Lone Star Steel Co., Dallas |
| L4 | Lukens Steel Co., Coatesville, Pa. |
| M1 | Mahoning Valley Steel Co., Niles, O. |
| M2 | McLouth Steel Corp., Detroit |
| M3 | Mercer Tube & Mfg. Co., Sharon, Pa. |
| M4 | Mid-States Steel & Wire Co., Crawfordsville, Ind. |
| M5 | Monarch Steel Div., Hammond, Ind. |
| M6 | Mystic Iron Works, Everett, Mass. [*] |
| N1 | National Supply Co., Pittsburgh |
| N2 | National Tube Div., Pittsburgh |
| N3 | Niles Rolling Mill Div., Niles, O. |
| N4 | Northwestern Steel & Wire Co., Sterling, Ill. |
| N5 | Newport Steel Corp., Newport, Ky. |
| N6 | Northwest Steel Rolling Mills, Seattle |
| N7 | Newman Crosby Steel Co., Pawtucket, R. I. |
| N8 | Northeastern Steel Corp., Bridgeport, Conn. |
| O1 | Oliver Iron & Steel Co., Pittsburgh |
| O2 | Oregon Steel Mills, Portland |
| P1 | Page Steel & Wire Div., Monessen, Pa. |
| P2 | Phoenix Iron & Steel Co., Phoenixville, Pa. |
| P3 | Pilgrim Drawn Steel Div., Plymouth, Mich. |
| P4 | Pittsburgh Coke & Chemical Co., Pittsburgh |
| P5 | Pittsburgh Screw & Bolt Co., Pittsburgh |
| P6 | Pittsburgh Steel Co., Pittsburgh |
| P7 | Portsmouth Div., Detroit Steel Corp., Detroit |
| P8 | Plymouth Steel Co., Detroit |
| P9 | Pacific States Steel Co., Niles, Cal. |
| P10 | Precision Drawn Steel Co., Camden, N. J. |
| P11 | Production Steel Strip Corp., Detroit |
| P12 | Pacific Steel Rolling Mills, Seattle |
| P13 | Phoenix Mfg. Co., Joliet, Ill. |
| R1 | Reeves Steel & Mfg. Co., Dover, O. |
| R2 | Reliance Div., Eaton Mfg. Co., Massillon, O. |
| R3 | Republic Steel Corp., Cleveland |
| R4 | Roebling Sons Co., John A., Trenton, N. J. |
| R5 | Rotary Electric Steel Co., Detroit |
| R6 | Rodney Metals, Inc., New Bedford, Mass. |
| R7 | Ronne Strip Steel Co., Rome, N. Y. |
| S1 | Sharon Steel Corp., Sharon, Pa. |
| S2 | Sheffield Steel Corp., Kansas City |
| S3 | Sherango Furnace Co., Pittsburgh |
| S4 | Simonds Saw & Steel Co., Fitchburg, Mass. |
| S5 | Sweet's Steel Co., Williamsport, Pa. |
| S6 | Standard Forging Corp., Chicago |
| S7 | Stankey Works, New Britain, Conn. |
| S8 | Superior Drawn Steel Co., Monaca, Pa. |
| S9 | Superior Steel Corp., Carnegie, Pa. |
| S10 | Seneca Steel Service, Buffalo |
| T1 | Tonawanda Iron Div., N. Tonawanda, N. Y. |
| T2 | Tennessee Coal & Iron Div., Fairfield |
| T3 | Tennessee Products & Chem. Corp., Nashville |
| T4 | Thomas Strip Div., Warren, O. |
| T5 | Tumken Steel & Tube Div., Canton, O. |
| T6 | Tremont nail Co., Wachem, Mass. |
| T7 | Texas Steel Co., Fort Worth |
| T8 | Thompson Wire Co., Boston |
| U1 | United States Steel Corp., Pittsburgh |
| U2 | Universal-Cyclops Steel Corp., Bridgeville, Pa. |
| U3 | Ulrich Stainless Steel, Wallingford, Conn. |
| U4 | U. S. Pipe & Foundry Co., Birmingham |
| W1 | Wallingford Steel Co., Wallingford, Conn. |
| W2 | Washington Steel Corp., Washington, Pa. |
| W3 | Weirton Steel Co., Weirton, W. Va. |
| W4 | Wheatland Tube Co., Wheatland, Pa. |
| W5 | Wheeling Steel Corp., Wheeling, W. Va. |
| W6 | Wickwire Spencer Steel Div., Buffalo |
| W7 | Wilson Steel & Wire Co., Chicago |
| W8 | Wisconsin Steel Co., Chicago, Ill. |
| W9 | Woodward Iron Co., Woodward, Ala. |
| W10 | Wycoff Steel Co., Pittsburgh |
| W11 | Worcester Pressed Steel Co., Worcester, Mass. |
| W12 | Wallace Barnes Steel Div., Bristol, Conn. |
| Y1 | Youngstown Sheet & Tube Co., Youngstown, O. |

PIPE AND TUBING

Base discounts (net) f.o.b. mills. Base price about \$200 per net ton.

BUTTWELD														SEAMLESS									
STANDARD T. & C.	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.		
	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	Bbl.	Gal.	
Sparrows Pt. B3	15.50	6.25	18.50	6.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	25.00	25.00	9.75								
Youngstown R3	17.50	6.25	20.50	6.25	23.00	7.75	25.50	9.00	26.00	10.00	26.50	10.50	28.00	10.75									
Fairless N2	6.00	+9.25	9.00	+5.25	11.25	+1.75	14.00	+1.00	14.50	+0.00	15.00	8.50	16.50	6.25									
Pittsburgh B3	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25	
Alton, IL L1	15.50	6.25	18.50	6.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	25.00	9.75									
Sharon M1	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75									
Fairless N2	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75									
Pittsburgh N1	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25	
Wheeling W5	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75									
Wheeland W4	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25	
Youngstown Y1	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75									
Indiana Harbor Y1	16.50	1.25	19.50	6.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75									
Lorain N2	17.50	2.25	20.50	6.25	23.00	9.00	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25	
EXTRA STRONG PLAIN ENDS																							
Sparrows Pt. B3	28.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75									
Youngstown R3	22.0	6.25	26.00	10.25	28.00	13.75	28.50	13.00	29.00	14.00	29.50	14.50	30.00	13.75									
Fairless N2	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75									
Fairless N1	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75									
Pittsburgh B3	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	6.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75	
Alton, IL L1	24.0	8.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75									
Sharon M1	22.0	8.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75									
Pittsburgh N1	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	6.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75	
Wheeling W5	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	6.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75	
Wheeland W4	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	6.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75	
Youngstown Y1	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	6.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75	
Indiana Harbor Y1	21.0	7.25	25.00	11.25	27.00	14.75	27.50	12.50	28.00	14.50	28.50	15.00	29.00	13.75									
Lorain N2	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	6.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75	

Threads only, butt weld and seamless 2½ pt higher discount. Plain ends, butt weld and seamless, 3-in. and under, 4½ pt higher discount. Butt-weld jobbers discount, 5 pct. Galvanized discounts based on nine price range of over 8¢ to 11½ per lb., East St. Louis. For each 2¢ change in nine, discounts vary as follows: 1½, 3½ and 1-in., 2 pt.; 1½, 1½ and 3-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., nine price range of over 11½ to 13¢ would lower discounts; nine price in range over 7¢ to 9¢ would increase discounts. East St. Louis nine price now 13.00¢ per lb.

Steel Prices (Effective Nov. 22, 1955)

To identify producers, see Key on preceding page.

MERCHANT WIRE PRODUCTS

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Tack Bars Treated
Bessemer <i>U1</i>	4.725	5.65	5.825				
So. Chicago <i>R3</i>	4.725	5.65		7.90			
Easley <i>T2</i>	4.725	5.65					
Fairfield <i>T2</i>	5.65		7.90		5.625		
Gary <i>U1</i>	4.725	5.65			5.625		
Ind. Harbor <i>I3</i>	4.725	5.65	5.825	7.90	5.525		
Johnstown <i>B3</i>		5.65					
Joliet <i>U1</i>		5.65	5.825				
Kansas City <i>S2</i>			7.90				
Lackawanna <i>B3</i>	4.725	5.65	5.825		5.625		
Minnequa <i>C6</i>	4.725	6.15	5.825	7.90	5.625	12.40	
Pittsburgh <i>O1</i>				11.90		12.40	
Pittsburgh <i>P5</i>						12.40	
Pittsburgh <i>B3</i>			7.90				
Seattle <i>B2</i>		6.40		5.775	12.90		
Steeltown <i>B3</i>	4.725		5.825		5.625		
Struthers <i>V1</i>			7.90				
Torrance <i>C7</i>					5.775		
Williamsport <i>S3</i>		5.65					
Youngstown <i>R3</i>			7.90				

ELECTRICAL SHEETS

F.o.b. Mill Cents Per Lb	22-Gage	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
			Semi- Processed	Fully Processed
Field			8.40	8.60
Armature			9.35	9.60
Elect.			9.95	10.20
Motor			10.95	11.20
Dynamo			11.85	12.10
Trans. 72			12.80	13.05
Trans. 65			13.35	13.55
			Grain Oriented	
Trans. 58			13.85	14.05
Trans. 52			14.85	15.05

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O., (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

WARE-HOUSES

City Delivery Charge	Base price, f.o.b., dollars per 100 lb.							
	Sheets				Strip	Plates	Shapes	Bars
	Hot-Rolled	Cold-Rolled	Galvanized (10 base)	Hot-Rolled	Hot-Rolled	Cold-Finished	Hot-Rolled As rolled	Hot-Rolled As rolled
Baltimore	5.10	7.03	8.32	8.37	7.65	7.21	7.93	7.61
Birmingham	15	6.80	7.93	8.85	7.06	6.99	7.28	7.08
Boston	10	7.70	8.81	10.27	7.94	10.30	7.89	8.13
Buffalo	30	6.80	7.90	7.97	7.15	7.15	7.40	7.10
Chicago	25	6.80	8.00	8.50	7.06	6.99	7.28	7.06
Cincinnati	25	6.92	8.33	8.90	7.30	7.28	7.75	7.32
Cleveland	30	6.80	8.00	8.85	7.16	7.16	7.61	7.14
Denver	8.60	10.76	11.22	8.98		8.60	8.75	8.90
Detroit	25	6.99	8.28	8.78	7.34	8.15	7.27	7.75
Houston	7.85	8.75	10.49	8.15		7.80	8.20	8.25
Kansas City	20	7.47	8.76	9.17	7.73	7.66	7.95	7.75
Los Angeles	10	8.05	10.00	11.00	8.35	8.65	8.30	8.05
Memphis	10	7.12	8.25		7.38	7.31	7.60	7.40
Milwaukee	25	6.89	8.18	8.59	7.15	7.08	7.45	7.17
New Orleans	15	7.20	8.35		7.45	7.40	7.70	7.50
New York	10	7.46	8.68	9.44	8.07	11.10	7.76	7.99
Norfolk	20	7.25			7.65	7.45	7.95	7.65
Philadelphia	10	7.14	8.42	9.35	7.67	7.37	7.74	7.64
Pittsburgh	25	6.80	8.09	9.20	7.16	9.00	6.99	7.25
Portland		7.80	8.80	10.65	8.80	7.95	7.75	7.85
Salt Lake City	20	8.60	10.15		10.60	9.35		8.15
San Francisco	10	8.10	9.65	10.15	8.35		8.05	8.25
Seattle	.00	8.55	10.40	10.80	8.65		8.20	8.30
St. Louis	25	7.00	8.38	9.19	7.35		7.28	7.68
St. Paul	25	7.46	8.59	9.16	7.72		7.65	7.94

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: ⁽¹⁾ 1500 to 9999 lb. ⁽²⁾ 1000 lb or over. ⁽³⁾ \$25 delivery. ⁽⁴⁾ 1000 to 1999 lb, \$25 delivery.

* Plus analysis charge.

F.o.b. Mill	Standard & Coated Nails				
	Cal	Col	Cal	Col	Cal
Alabama City <i>R3</i>	152	162	173	175	7.40
Alliquippa, Pa. <i>J3</i>	152	162			7.40
Atlanta <i>AS</i>	154	167	175	178	7.50
Bartonsville <i>K2*</i>	154	168	175	181	7.50
Buffalo <i>W6</i>					7.40
Chicago, Ill. <i>N**</i>	152	166	173	179	7.40
Cleveland <i>A5</i>	157				7.40
Crawfordsville <i>M4</i>	154	167	175	175	7.50
Dunton, Pa. <i>A5</i>	152	162	173	175	7.40
Duluth <i>A5</i>	152	162	173	175	7.40
Fairfield, Ala. <i>T2</i>	152	162	173	175	7.40
Galveston <i>D4</i>	157				
Hannibal, Mo. <i>B3*</i>	157	166			180
Johnstown, Pa. <i>B3*</i>	152	162			175
Juliet, Ill. <i>A5</i>	152	162	173	175	7.40
Kakomo, Ind. <i>C9</i>	154	154	175	177	7.50
Los Angeles <i>R2*</i>	157	174			180
Kansas City <i>S2</i>	157	174			6.65
Minnequa <i>C6</i>	157	167	162	178	7.65
Monessen <i>P6</i>	152	162			7.40
Moline, Ill. <i>R3</i>			162	162	
Pittsburgh, Cal. <i>C7</i>	171	185			195
Portsmouth, Pa. <i>P2</i>					7.40
Ranbin, Pa. <i>A5</i>	152	162	173	175	7.40
San. Chicago <i>R3</i>	152	162	157	173	7.40
S. San Francisco <i>C6</i>			197	195	8.35
Sparrows Pt. <i>B3*</i>	154		175	181	8.75
Struthers, O. <i>V1</i>			175	175	7.40
Worcester <i>A5</i>	158		160		7.70
Williamsport, Pa. <i>S3</i>					

Galvanized products computed with zinc at 5¢ per lb. Exceptions: * zinc at 12.5¢ per lb; ** 13¢ zinc.

C-R SPRING STEEL

F.o.b. Mill	CARBON CONTENT				
	0.26	0.41	0.61	0.81	1.08
0.40	0.60	0.80	1.05	1.35	
Bristol, Conn. <i>W12</i>			10.80	12.95	15.65
Buffalo, N.Y. <i>R7</i>	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. <i>S9</i>	7.00	8.95	10.50	12.65	15.35
Cleveland <i>A5</i>	7.10	9.05	10.60	12.75	
Detroit <i>D1</i>	7.10	9.05	10.60		
Detroit <i>D2</i>	7.10	9.05	10.60		
Harrison, N. J. <i>C11</i>	7.15	9.10	10.50	12.65	15.35
Indianapolis <i>C5</i>	7.00	8.95	10.50	12.65	
New Castle, Pa. <i>B4</i>	7.45	9.25	10.80	12.95	
New Haven, Conn. <i>D1</i>	7.55	9.25	10.80	12.95	15.65
Pawtucket, R. I. <i>N7</i>	7.00	8.95	10.50	12.65	15.35
Pittsburgh <i>S7</i>	7.00	8.95	10.50	12.65	15.35
Rivertown, Ill. <i>A1</i>	7.10	8.95	10.50	12.65	15.35
Sharon, Pa. <i>S1</i>	7.00	8.95	10.50	12.65	15.35
Trenton <i>R4</i>					
Wallingford <i>W1</i>	7.45	9.25	10.80	12.95	15.65
Warren, Ohio <i>T4</i>	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. <i>W3</i>	7.10	8.95	10.50	12.65	15.35
Worcester, Mass. <i>A5</i>	7.85	9.25	10.80	12.95	15.65
Youngstown <i>C5</i>	7.00	8.95	10.50	12.65	15.35

F.o.b. Mill	Size				
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.
Babcock & Wilcox	2	13	30.87	36.51	29.95
	2½	12	41.57	49.16	46.31
	3	12	47.99	56.76	46.55
	3½	11	56.03	66.27	54.34
	4	10	74.41	88.90	72.17
National Tube	2	13	30.87	36.51	29.95
	2½	12	42.57	49.16	46.31
	3	12	47.99	56.76	46.55
	3½	11	56.03	66.27	54.34
	4	10	74.41	88.90	72.17
Pittsburgh Steel	2	13	30.87	36.51	29.95
	2½	12	41.57	49.16	46.31
	3	12	47.99	56.76	46.55
	3½	11	56.03	66.27	54.34
	4	10	74.41	88.90	72.17

Miscellaneous Prices

(Effective Nov. 22, 1955)

TOOL STEEL

F.o.b. mill					
W	Cr	V	Mo	Co	per lb
18	4	1	—	—	\$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105
High-carbon chromium					.77
Oil hardened manganese					.43
Special carbon					.89
Extra carbon					.83
Regular carbon					.275
Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.					

CLAD STEEL

Cladding	Base prices, cents per lb f.o.b.			
	Plate (A3, J2, LF)	Sheet (J2)	10 pct	15 pct
304	30.30	33.15	38.00	32.50
316	35.50	38.45	41.40	47.00
321	32.00	34.85	37.75	37.25
347	34.40	37.90	41.40	48.25
405	25.80	29.60	33.35	—
410, 430	25.30	29.10	32.85	—

CR Strip (B9) Copper, 10 pct, 2 sides, \$8.00; 1 side, 30.00.

LAKE SUPERIOR ORES

61.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	\$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.00 to \$14.50
Foundry, beehive (f.o.b. oven)	Connellsville, Pa.
Buffalo, del'd	28.08
Chicago, f.o.b.	25.75
Detroit, f.o.b.	26.25
New England, del'd	26.05
Seaboard, N. J., f.o.b.	25.50
Philadelphia, f.o.b.	25.00
Wedeland, Pa., f.o.b.	25.00
Plainville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.90
Cleveland, del'd	27.48
Cincinnati, del'd	26.56
St. Paul, f.o.b.	25.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	24.40
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75	—	—	—
2	24	35.50	—	—	—

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Machine and Carriage Bolt

Quantity	Discounts	
	Full case	Full case 20,000 lb.
1/4 in. & smaller x 6 in. & shorter	61	63
Larger than 1/4 in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts	—	—
1/4 in. & smaller x 6 in. & shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

5/8" or smaller	64	66
5/8" to 1 1/8" inclusive	62	65
1 1/8" to 1 1/4" inclusive	65	67
1 1/4" and larger	61	63

C.P. Hex. regular & hvy.

5/8" or smaller	64	66
5/8" and larger	61	63

Hot Galv. Nuts (all types)

1 1/4" or smaller	44	47
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Finished, Semi-finished, Hex. Nuts

5/8" and smaller	66	66
5/8" and larger	63	63
Add 25% for less than case or keg quantity.		

Rivets

	Base per 100 lb
1/4 in. and larger	\$9.95
7/16 in. and smaller	32

Cap Screws

Discount	H.C. Heat	
Bright Treated		
New std. hex head, packaged		
1/4" thru 1/2" diam. x 6" and shorter	34	20
9/16" and 5/8" x 6" and smaller and shorter	31	16
5/8", 3/4", 1" x 6" and shorter	8	+11
New std. hex head, bulk		
1/4" thru 1/2" diam. x 6" and shorter	49	41
9/16" and 5/8" diam. x 6" and shorter	48	39
5/8", 3/4", 1" x 6" and shorter	31	20
* Minimum quantity per item: 15,000 pieces 1/4", 5/16", 3/8", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 15/16", 1", 1 1/8", 1 1/4", 1 1/2", 1 3/4", 1 5/8", 1 7/8", 1 15/16", 1 31/32", 1 63/64", 1 155/128", 1 311/128", 1 623/128", 1 157/128", 1 315/128", 1 633/128", 1 159/128", 1 317/128", 1 637/128", 1 161/128", 1 319/128", 1 639/128", 1 163/128", 1 321/128", 1 641/128", 1 165/128", 1 323/128", 1 643/128", 1 167/128", 1 325/128", 1 645/128", 1 169/128", 1 327/128", 1 647/128", 1 171/128", 1 329/128", 1 649/128", 1 173/128", 1 331/128", 1 651/128", 1 175/128", 1 333/128", 1 653/128", 1 177/128", 1 335/128", 1 655/128", 1 179/128", 1 337/128", 1 657/128", 1 181/128", 1 339/128", 1 659/128", 1 183/128", 1 341/128", 1 661/128", 1 185/128", 1 343/128", 1 663/128", 1 187/128", 1 345/128", 1 665/128", 1 189/128", 1 347/128", 1 667/128", 1 191/128", 1 349/128", 1 669/128", 1 193/128", 1 351/128", 1 671/128", 1 195/128", 1 353/128", 1 673/128", 1 197/128", 1 355/128", 1 675/128", 1 199/128", 1 357/128", 1 677/128", 1 201/128", 1 359/128", 1 679/128", 1 203/128", 1 361/128", 1 681/128", 1 205/128", 1 363/128", 1 683/128", 1 207/128", 1 365/128", 1 685/128", 1 209/128", 1 367/128", 1 687/128", 1 211/128", 1 369/128", 1 689/128", 1 213/128", 1 371/128", 1 691/128", 1 215/128", 1 373/128", 1 693/128", 1 217/128", 1 375/128", 1 695/128", 1 219/128", 1 377/128", 1 697/128", 1 221/128", 1 379/128", 1 699/128", 1 223/128", 1 381/128", 1 701/128", 1 225/128", 1 383/128", 1 703/128", 1 227/128", 1 385/128", 1 705/128", 1 229/128", 1 387/128", 1 707/128", 1 231/128", 1 389/128", 1 709/128", 1 233/128", 1 391/128", 1 711/128", 1 235/128", 1 393/128", 1 713/128", 1 237/128", 1 395/128", 1 715/128", 1 239/128", 1 397/128", 1 717/128", 1 241/128", 1 399/128", 1 719/128", 1 243/128", 1 401/128", 1 721/128", 1 245/128", 1 403/128", 1 723/128", 1 247/128", 1 405/128", 1 725/128", 1 249/128", 1 407/128", 1 727/128", 1 251/128", 1 409/128", 1 729/128", 1 253/128", 1 411/128", 1 731/128", 1 255/128", 1 413/128", 1 733/128", 1 257/128", 1 415/128", 1 735/128", 1 259/128", 1 417/128", 1 737/128", 1 261/128", 1 419/128", 1 739/128", 1 263/128", 1 421/128", 1 741/128", 1 265/128", 1 423/128", 1 743/128", 1 267/128", 1 425/128", 1 745/128", 1 269/128", 1 427/128", 1 747/128", 1 271/128", 1 429/128", 1 749/128", 1 273/128", 1 431/128", 1 751/128", 1 275/128", 1 433/128", 1 753/128", 1 277/128", 1 435/128", 1 755/128", 1 279/128", 1 437/128", 1 757/128", 1 281/128", 1 439/128", 1 759/128", 1 283/128", 1 441/128", 1 761/128", 1 285/128", 1 443/128", 1 763/128", 1 287/128", 1 445/128", 1 765/128", 1 289/128", 1 447/128", 1 767/128", 1 291/128", 1 449/128", 1 769/128", 1 293/128", 1 451/128", 1 771/128", 1 295/128", 1 453/128", 1 773/128", 1 297/128", 1 455/128", 1 775/128", 1 299/128", 1 457/128", 1 777/128", 1 301/128", 1 459/128", 1 779/128", 1 303/128", 1 461/128", 1 781/128", 1 305/128", 1 463/128", 1 783/128", 1 307/128", 1 465/128", 1 785/128", 1 309/128", 1 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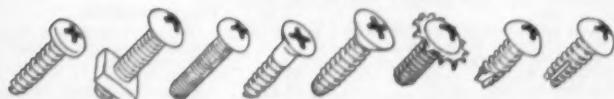
Now, to your particular fastening problem, American brings longer experience, more progressive engineering, more extensive production facilities, and a complete range of types, head-styles, sizes and metals. So on every count you're bound to win with American Phillips Screws . . . as do many of the top producers in your own industry. Find out why. Write:

✗ marks the spot . . . the mark of extra quality

AMERICAN SCREW CO.

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Plants at Willimantic, Conn., and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan



Ferroalloy Prices

(Effective Nov. 22, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 67-71% Cr, .30-1.00% max. Si.	25.00
0.05% C ...	25.50
0.08% C ...	26.50
0.10% C ...	26.00
0.15% C ...	26.75
4.00-4.50% Cr, 67.70% Si, 1-2% Fe.	26.25
3.50-5.00% Cr, 67-64% Cr, 1.00-4.00% Si	25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads	28.65
Ton lots	30.55
Less ton lots	32.95

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add \$4 per lb to regular low carbon ferrochrome price schedule. Add \$4 for each additional 0.25% of N.	
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Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.86

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 43-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 2-in. x down, per lb of Cr, packed.	
Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed, 30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed, 16-18% Ca, 14-18% Mn, 53-59% Si.	
Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 10% Fe 1/4 in. x 18 mesh.	
Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots	16.60
Ton lots	18.10
Less ton lots	19.55

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed	17.50
Ton lots to carload packed	18.25
Less ton lots	19.50

Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 76 pct Mn. Producing Point per-lb	
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Claifton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn: Carloads, bulk	12.10
Ton lots packed	14.80

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	
Manganese Silicon	
16 to 19% 3% max.	\$86.00
19 to 21% 3% max.	88.00
21 to 23% 3% max.	90.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads	30.00
Ton lots	22.00
250 to 1999 lb	34.00
Premium for hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn.	
21.85	

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.	
Carloads Ton Less	
0.07% max. C, 0.06% P, 90% Mn	22.00 23.85 25.05
0.07% max. C	29.95 31.30 33.80
0.15% max. C	28.45 30.30 31.50
0.20% max. C	26.95 28.80 30.00
0.50% max. C	26.45 28.30 29.50
0.75% max. C, 80-85% Si	23.45 25.30 26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ for shipping point.	
Carload bulk	11.20
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.70
Ton lots, packed	14.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$90.00 gross ton, freight allowed to normal trade areas. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$87.50. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.	
Ton lots	19.65
Less ton lots	20.90

Silicon Metal

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.	
Cast Turnings Distilled	
Ton lots	\$2.05 \$2.95 \$2.75
Less ton lots	3.40 3.30 4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.	
Openhearth	3.10
Crucible	3.10
High speed steel (Primos)	3.50

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.	
Carloads	10.25¢
Ton lots	11.50¢

Calcium molybdate, 46.3-46.6% f.o.b. Langloch, Pa., per pound contained Mo	\$1.38
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Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.	
Ton lots	\$6.90

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta	\$4.65
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Fermolybdenum, 55-75% 200-lb containers, f.o.b. Langloch, Pa., per pound contained Mo	\$1.48
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Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton	\$90.00
10 tons to less carload	\$110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.38
Less ton lots	\$1.55

Ferrortitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton	\$177.00
Less ton lots	\$8.45

Molybde oxide, briquets, per lb contained Mo, f.o.b. Langloch, Pa.	\$1.27
Bags, f.o.b. Washington, Pa.	\$1.34

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.	
Carload, bulk lump	15.50¢
Ton lots, packed lump	16.75¢

Vanadium oxide, 56-59% V ₂ O ₅ , contract basis, per pound contained V ₂ O ₅	\$1.55
Less ton lots	\$1.55

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carload, packed	\$2.25¢
12-15%, del'd, lump, bulk, carloads	\$1.50¢



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SET SCREWS • MILLED STUDS
... our specialty.

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By order of the U. S. District Court, Eastern District of Wisconsin, Milwaukee, Wisconsin

All of the operating assets of the bankrupt Northeastern Boiler & Welding, Ltd., Green Bay, Wisconsin

STEEL FABRICATORS

consisting of approximately 71 acres of land, on state and federal highways, adjacent to C & N W R'y mainline with tracks running into main building; buildings, machinery and equipment, automobiles and trucks, furniture and fixtures, inventory and work in process and assignment of executory contracts and orders for the production of goods, and furnishing labor and materials.

AN UNUSUAL OPPORTUNITY FOR A LARGE COMPANY TO DISPERSE ITS OPERATIONS OR FOR A SMALLER MANUFACTURER OF HEAVY MACHINERY OR FABRICATING TO TAKE OVER A GOING CONCERN WHICH HAS NOT BEEN CLOSED FOR A SINGLE DAY AND HAS OPERATED WITH SUBSTANTIAL NET PROFIT UNDER THE TRUSTEE.

For more detailed information and inventory, and terms of sale and bidding, write Mr. Frank Cartier, Trustee, Northeastern Boiler & Welding, Ltd., Green Bay, Wisconsin.

U. S. DISTRICT COURT FOR EASTERN DISTRICT OF WISCONSIN, MILWAUKEE, WILL RECEIVE BIDS THEREFOR ON DECEMBER 5, 1955, AT 2 O'CLOCK P. M., IN OPEN COMPETITIVE BIDDING.

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metalworking industry. Will
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or STEEL"

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Boom Hits Pittsburgh . . . With steel mills straining facilities to the limit in order to maintain above capacity operations, machinery maintenance and replacement continues to increase. This, coupled with the fact that smaller manufacturers and marginal steel producers are doing an increased volume of business during the current steel boom, has pushed sales of used and rebuilt machinery dealers to new highs for the year. The scarcity of good used machinery and depleted dealer stocks are limiting factors for even better business.

Inquiries from points all over the country are common with the percentage of sales to inquiries very good. Dollar volume of unit sales are also high with whole mill installations the rule in the majority of steel equipment sales. Dealers are doing a lot more pencil work these days in preparing estimates. It is the exception when a dealer can lay his hands on the exact equipment asked for in an inquiry. As a result, a lot of extra work is required in figuring out substitute equipment and cost of rebuilding equipment to customer specifications.

Machine tool dealers continue to experience good sales and the final picture for 1955 will be a good one despite a couple of months earlier in the year when sales were off. The recent resurgence of the smaller machine shops has added materially to his business. This has also provided an outlet for smaller and older machine tools made available by the larger shops in their modernization and expansion programs.

Crane Demand Strong . . . Used cranes continue in strong demand, but their availability is getting worse all the time. Heavy duty, large span cranes are particularly hard to get. While the inquiries for the larger cranes are abundant, the more available smaller

cranes represent the greatest sales volume. Dealers are scouring the country for good used, heavy duty cranes.

Equipment Sales Up . . . Steel mill equipment sales are up sharply again this month as has been the case every month since early in the year. Mill expansion, particularly by the smaller producers, has been the big factor so far, but heavy production schedules are beginning to take their toll of older equipment.

Rebuilders of electrical equipment also have shown progressively increased activity and expect sales for the year to be as much as 40 per cent above 1954. The greater portion of business is for heavy duty motors, generators, etc.

Rebuilders Swamped . . . Like almost every type of business associated with the steel industry, the used and rebuilt machinery trade is swamped with more business than it can handle. A large portion of business is for expansion and replacement of badly worn or obsolete equipment which is reducing trade-ins. This is also true in many cases where new equipment is purchased.

Fourth Quarter Pickup . . . Some Eastern dealers, comparing the general level of fourth quarter business with that of the first three quarters, note a pickup in overall volume of around 25 pct. Normally, stronger volume is felt the first half of the year. Dealers generally don't discredit the stronger 3rd and 4th quarter business to the Machine Tool Show in Chicago.

Sales are up for most weights of double-crank presses. In general, dealers point out that late-type machine tools are toughest to get hold of. Demand for air compressors, it's noted, is currently outstripping supply.

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ELECTROMELT FURNACE: Moore Lectromelt Furnace, Type S, Size QT. ANNEALING FURNACES: 2-Surface Combustion Roller Hearth Recirculating Furnaces, Ind Circulating Air Roller Hearth Furnace. 2-Push Type Furnaces.

CUPOLAS: 4-Whiting No. 10, Model B Cupolas. 4-12,000 C.F.M. Blowers. 30-Bull Ladies. 5-Tilting Ladies.

OVENS: 5-Coleman Tower Core Ovens. 3-Coleman and Lony Horizontal Core Ovens. 3-Coleman and P.D. Rock Type Core Ovens.

6-Coleman Paste Drying Ovens.

SAND MIXING & RECLAIMING: 4-Clearfield No. 930 Mullers. 2-Simpson No. 25 type B Mullers. National No. 6 Muller, Beardley & Piper No. 70 and 35½" Sand Mullers. 2-Baker Perkins No. 18½ Sand Mixers, Spiral Mud Mixers. Allis-Chalmers No. 24-10 Core Crusher. Link-Belt No. 502-20 Sand Dryer. Bartlett & Snow Sand Screens. Aireators. 8-Sand Storage Bins Up to 200 Ton Capacity. 10-Bucket Elevators.

SAND SLINGERS: Beardley & Piper 19" DB with Turn-Table and Sand Bin. 3-Beardley & Piper Type 5. 16" DB Sand Slingers.

CORE BLOWERS: 46-Osborn, International and Champion Core Blowers. From Osborn No. 3502-I Five Station Automatic to Bench Type. Core Blowers.

ROLLOVERS: 22-International Roll-Overs, 14"x12" and 14"x8" Type R. 7-Aust. Roll-Overs, Up to 12"x32" and 12"x16".

STRIPPERS: 5-Milwaukee No. 620 NDI Power Strippers.

SHAKEOUTS: 19-Robins and Simplicity Shakeouts, 19"x108", 19"x72", 24"x76", 48"x72", 36"x72", 32"x72", 24"x72", 36"x48", and 24"x34" Sizes.

JOLT SQUEEZE: 26-Osborn, International and Milwaukee. Asst. Jolt Squeeze and Jolt Squeeze Strip Molding Machines.

CORE GRINDERS: 2-Milwaukee No. 70-12 and 7-Milwaukee No. 70-9 Rotary Core Grinders.

TUMBLING BARRELS: 12-Tumbling Barrels, Including 2-Wheelabator 48"x48"x20 Cu. Ft. Tumblasts.

CASTING CLEANING: Pangborn No. E5259 Monorail Conveyor Type Rotoblast 42'6" L x 9'W x 10'H. Also 3-Sand Blasts Cabinet Type.

DUST COLLECTORS: 5-Pangborn No. CH2 and 4-Pangborn No. 220 Type CK Dust Collectors.

MISC. FOUNDRY EQPT: 3-Wire Forming Machines. 4-Wire Straightening and Cut-Off Machines. Rod Straighteners. 2000-Flask Sets. 23,000-Core Plates. Flask Bushings. \$260,000 of Foundry Machine Repair and Replacement Parts. Alloys, Refractories. 250-Air Hoists. (250)-Foundry and Factory Trucks. 47-Charging Buckets, Etc. AIR COMPRESSORS: Ingersoll-Rand 5400 C.F.M. 30"x18"x21" Horizontal, 2-Stage, 4-Corner, Type PRE-2-C, 1000 H.P. Motor Driven Air Compressor. 2-Ingersoll-Rand 26"x16½"x18", Type PRE-2, 385 H.P. Motor Driven and Ingersoll-Rand 25"x15¾"x18", Type PRE-2, 324 H.P. Motor Driven, 2-Stage, Horizontal Air Compressors. Pennsylvania 4"x6" Horizontal Air Compressor.

CRANES: 2-10 Ton Elect. Traveling Bridge Cranes. 2-8 Ton Elect. Traveling Bridge Cranes, Elect. Monorail Cranes. 4-4-Ton Elect. Monorail Charging Cranes. 4-Magnets, Etc.

TRUCKS & TRACTORS: 1-H and Ford Tractors. Hough Payloader. 14-Gas and Electric Fork Up to 7000 lb. Cap. 10-Elect. Platform Lift Trucks. 11-Clark Gas Towing Tractors. 3-Hyd. Lifts. 3-Dump Trucks. 1½, 3½, and 5 Ton Cap. Stock Body and Pick-Up Trucks. Station Wagon and Jeep. 1250-Foundry and Factory Trucks. Garage Equipment.

CONVEYOR: 7900 Ft. of Overhead Chain Conveyor. 1100 Ft. of Mold Car Conveyor. 5750 Ft. of Belt Conveyor. 3100 Ft. of Gravity Conveyor. 500 Ft. of Slat Conveyor.

TOOL ROOM EQPT: Rockford 32"x34"x120" Hyd. Open-Side Shear Planer. Bullard 36" Vertical Turret Lathe. 10-Lathes Up to 42"x192". 5-Milling Machines, Van Norman No. 36, K&T 2K Vert., K&T 3K Plain, K&T 2H Plain. 4-Shapers Including Cincinnati 24" Universal. U-Radial Drill. 40-Grinders Including Cincinnati No. 2 CAT Diamond 36" Face, Etc. 19-Welders. Universal Boring Mill. 10-Presses. 15-Drill Presses. Planer, Keyseater, Hammers, Saws, Tappers, M.G. Sets. Wood Working Machinery.

MISCELLANEOUS: 21-Transformers, 1000 K.V.A. to 75 K.V.A. 18,000 Gal. Outside Propane Tank. 100,000 lb. Tool Steel, CRS, HRS, Etc. 10 Ton of Wire. 1000-Tote Pens. Lockers. Benches. Factory Supplies and Equipment. Garage Equipment.

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 1-30" x 97" BLOOMING OR SLAB MILL, 2-HIGH, reversing.
 1-4-HIGH HOT STRIP MILL STANDS for up to 76" width.
 1-14" x 24" STRIP MILL, 2-HIGH.
 1-20" x 20" 2-HIGH COLD MILL, with motor drive.
 1-12" x 12" 2-HIGH COLD MILL, roller bearings.
 1-10" x 16" 2-HIGH TANDEM COLD MILL, 3 stands, with D.C. Drives.
 1-6" x 8" 2-HIGH COLD MILL.
 1-24" BAR MILL, 3-HIGH, 3 stands, with variable speed, D.C. motor, traveling lifting tables, roller tables, saws, bloom shear, furnaces.
 1-10" x 60" 3-HIGH BREAKDOWN MILL, 1 roll stand, pinion stand, 500 H.P. motor and controls.
 1-9" BAR MILL, 3-HIGH, 4 stands: 2 spare stands.
 1-10" BAR MILL STANDS, 2-HIGH, with 400 H.P. motor and controls.
 1-4-HIGH SINGLE STAND COLD MILL for strip up to 14" wide.
 2-UNITED ALLIGATOR SHEARS, 4" square and 2½" square.
 1-34" x 192" ROLL GRINDER with motors and controls.

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 1-STAMCO #6 CORRUGATING MACHINE for sheets, removable dies.
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1	2500	Whse.	720	600	4160/2300
2	2500	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
1	500	Whse.	1800	125/250	2300/440
1	500	Cr. Wh.	1800	125/250	2300/440
1	300	G.E.	720	525	2300
1	300	G.E.	1800	250	2300
1	150	G.E.	1800	250	2300
1	100	Whse.	960	250	2300

LARGE MILL MOTORS

Qu.	H.P.	Make	R.P.M.	Volts	Type
2	3000	Whse.	600	525	tandem
6	1500	Whse.	600	525	Encl.
1	1500	G.E.	370/750	600	MCF-6
4	800	Whse.	600	525	Encl.
4	700	Whse.	300/700	250	Encl.
2	600	Al. Ch.	200/600	600	Mill
1	250	Al. Ch.	250/1000	250/375	Mill

SUPER RING MOTORS

Constant Duty, 3 Phase, 60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	1500	G.E.	MT-400	2300	360
1	1500	G.E.	M-575-R	2300	1185
1	750	G.E.	T-M	2300	400
1	500	Al. Ch.	ANY	2300	500
1	500	G.E.	T-M	2300	400
1	450	G.E.	T-14-M	2300	505
1	450	Whse.	CW	2300	440
1	400	Al. Ch.	ANY	2200	505
1	400	G.E.	MT-424	2300/410	352
1	300	Whse.	CW-1012	2300	704
1	150	Al. Ch.	410	700	700
1	120	Whse.	CW-1100	2300	435
1	250	G.E.	MT-414	2300	300
2	200	Al. Ch.	ANY	2200	585
1	200	G.E.	T-14-M	2200	490
1	150	Al. Ch.	ANY	440/230	705
1	150	Whse.	CW-1000	440/230	600
1	150	Whse.	CW	440/230	435
1	100	El. Dy.	EDY-612	2300	900
1	100	G.E.	MT-558	440/230	700
1	100	G.E.	T-15-A	2300	495
1	100	Al. Ch.	ANY	440/220	430

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Multiple Punches

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1	1500	A.C.	MIN	2300	540
1	800	G.E.	MT	2300	595
1	700	A.C.	MIN	2300	560
1	500	G.E.	MT-418	2300	580
1	500	Whse.	CW	550	580
1	500	G.E.	MT-500	2300	580
1	400	Whse.	12-500A	440	515
1	400	Whse.	CW-1218	2300	485
1	350	G.E.	MT-458	2300/4000	355
1	350	G.E.	IM-17A	440/2200	730
1	250	G.E.	MT-424	2300	587
1	250	G.E.	MT-500	2300	1800
1	200	Al. Ch.	ARW	440	600
1	200	Cr. Wh.	20Q	440	505
1	200	G.E.	IM	440	425
1	150	(unused) Whse.	CW	2300	485
1	125	A.C.	ARW	440	720
1	100	G.E.	IM-16	2300	635
1	100	G.E.	IM	440	600
1	100	A.C.	ANY	440	600

SQUIRREL CAGE

1	800	G.E.	KT-575	2300	1100
1	800	G.E.	KT-625-S	2300	1100
1	450	Whse.	CR-1420	2300/4100	854
1	400	G.E.	IE-15B	2300	1145
1	400	G.E.	IK	2300	1000
1	300	G.E.	IK-17	440	1000
1	200	G.E.	KT-557	440	1000
1	150/15	G.E.	IK	440/4000/450	1000
1	150	Whse.	CR-8568	440	885
1	125	Al. Ch.	ARW	2300	1750
1	100	Whse.	TM-540C-TEPC	440	710

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1	650	C.W.	3500-1-HL	13800/6000	514
1	2000	G.E.	ATI	2300	150
2	1750	G.E.	ATI	2300	300
2	785	G.E.	ATI	2300/12000	600
1	500	Ideal	SM	2300/4100	1600
1	450	Whse.	TR-7507	2300	1100
1	450	Whse.	TR-7507	2300	125.5
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1	400	G.E.	TR	2300	1200

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200	Cr. Wh.	CM	500
175	G. E.	ELC	750
150	G. E.	MPC	400/500
100	G. E.	RC-34	2500
100	G. E.	RC-19	575
75/75	Westg.	RK-151	400/7300
50/120	G. E.	MCP	250/1000
50	Cr. Wh.	CMC	760/1100
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ADVERTISERS IN THIS ISSUE

An asterisk (*) beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturers for your copies today.

A

Ajax Electric Co., Inc.	38	Eastern Machinery Co., The	142
Ajax Electric Furnace Co.	38	*Electric Controller & Mfg. Co.	14
*Ajax Electrothermic Corp.	38	The	14
Ajax Engineering Corp.	38	Electrolift, Inc.	149
*Allegheny Ludlum Steel Corp.	103	Elox Corporation of Michigan	147
*Allis-Chalmers Mfg. Co.	36	Espe-Lucas Machine Works, The	149
American Screw Co.	135		
*American Steel Foundries, King Machine Tool Div.	Back Cover		
*Armco Steel Corp.	6		
Armel, James P.	144		
*Armstrong Bros. Tool Co.	148		

B

*Babcock & Wilcox Co., The Refractories Div.	25
Basic Refractories, Inc.	Inside Front Cover
Belyea Co., Inc.	140
Benkart Steel & Supply Co.	144
Bennett Machinery Co.	143
Bethlehem Steel Co.	1, 150
Birdsboro Steel Fdry. & Machine Co.	127
Boynton, A. J. & Co.	148
Brandi Machinery Co.	142
Bridgeport Brass Co.	Between Pages 20, 21
Brownell, Hazard, Machine Tools, Inc.	143

C

Cameron Iron Works, Inc., Special Products Dept.	33
*Carboloy Dept. of General Electric Co.	28, 29
Carborundum Co., The Ferro Carbo Div.	96, 104
Carlisle Frank, Trustee	137
Central Boiler & Mfg. Co.	113
Chicago Electric Co.	142
*Cincinnati Bickford Tool Co., The	12
Columbia-Geneva Steel Div., United States Steel Corp.	Between Pages 16, 17, 146
Columbia Tool Steel Co.	116
Consolidated Railway Equipment Co.	141
Copperweld Steel Co., Ohio Seamless Tube Division	100
Crawford, F. H. & Co., Inc.	142
Cross Company, The	10
Crucible Steel Co. of America	24

D

*Danly Machine Specialties, Inc.	
Between Pages 20, 21	
Davis, Samuel M.	144
Daico Products Div., General Motors Corp.	26, 27
*Diamond Manufacturing Co.	148
Donahue Steel Products Co., Inc.	140
Dony, D. E., Machinery Co.	142
Dreis & Krump Mfg. Co.	148

E

Eastern Machine Screw Corp., The	149
----------------------------------	-----

(Continued on Page 148)

Eastern Machinery Co., The	142
*Electric Controller & Mfg. Co.	14
The	14
Electrolift, Inc.	149
Elox Corporation of Michigan	147
Espe-Lucas Machine Works, The	149

F

Falk Machinery Co.	143
Fellows Gear Shaper Co., The	58
*Finkl, A. & Sons, Co.	64
Flour City Ornamental Iron Co., The	146
Foster, Frank B., Inc.	140
*Fostoria Pressed Steel Corporation	34
Frank, M. K.	143

G

*Gallmeyer & Livingston, Inc.	111
Garnier, John	143
*General Electric Co., Chemical and Metallurgical Division	75
Gisholt Machine Co.	Between Pages 52, 53
Goodman Electric Machinery Co.	142
Goss & DeLeeuw Machine Co.	148
Gray, G. A. Company	117
Great Lakes Steel Corp.	57
Green Instrument Co.	11
Griffin Manufacturing Co.	149

H

Henry, A. T. & Company, Inc.	141
Hughes, Arnold Co.	145
Hyman, Joseph & Sons	141
Hyman-Michaels Co.	142
Hynes Steel Products Co.	144

I

Industrial & Mill Suppliers, Inc.	142
*Inland Steel Co.	78
*International Nickel Co., Inc.	
The	Between Pages 20, 21
Interstate Machinery Co.	142, 144
Iron & Steel Products, Inc.	138

J

Jeffrey Mfg. Co., The	4
Jones & Laughlin Steel Warehouse Division, Jones & Laughlin Steel Corp.	76, 77

K

Kaiser Steel Corp.	145
Kasle Steel Corp.	143
*Kearny & Tracker Corp.	66
Keystone Steel & Wire Co.	74
King Tester Corp.	149
Kinnear Manufacturing Co., The	105

L

LaMson & Sessions Co., The	99
Land, L. J., Inc.	141
Lang Machinery Co.	140



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(Continued from Page 147)

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S	
*LaSalle Steel Co.	30, 31
*Loes-Bradner Co., The	42
Leland-Gifford Co.	149
Link-Belt Co.	21
*Lukens Steel Co.	70
Lummite Bureau, Universal Atlas Cement Co.	Between Pages 16, 17
Luria Bros. & Co., Inc.	123, 140, 143
M	
McKee, Arthur G. & Co.	146
MacCabe, T. B. Co.	140
Master Electric Co., The Inside Back Cover	
Miles Machinery Co.	142, 143
Mississippi Valley Equipment Co.	141
Mobile Industrial Equip. Corp.	141
Monsanto Chemical Co., Plastics Div.	17
Montgomery Eng. Co.	142
Morgan Engineering Co., The	115
Morrison Railway Supply Co.	143
*Mundt, Chas. & Sons	149
N	
National Machinery Exchange ..	140
National Malleable & Steel Castings Co.	98
National Steel Corp.	57
*Nelson Stud Welding Div. of Gregory Industries, Inc.	106, 107
Newport Steel Corp.	95
New York & New Jersey Lubricant Co.	110
New York Shipbuilding Corp.	144
Northeastern Boiler & Welding, Ltd.	137
O	
*Ohio Electric Mfg. Co., The ..	125
Ohio Galvanizing Mfg. Co.	144
Ohio Seamless Tube Div. of Copperweld Steel Co.	160
Ornitz Equip. Corp.	144
Osborn Mfg. Co., The	5
Ottemiller, Wm. H. Co.	137
P	
*Peerless Electric Co.	109
Pittsburgh Steel Co., Thomas Strip Div.	Front Cover
Production Carbide & Steel Co.	146
Purdy Company, The	142
R	
Regan Equip. Co.	145
Republic Machinery Co.	141
*Republic Steel Corp.	18, 19
*Revere Copper & Brass, Inc.	48
Roebling's, John A. Sons, Corp. Between Pages 52, 53	
Rotary Elec. Steel Co.	145
Ruthman Machinery Co., The	110
Ryerson, Jas. T. & Son, Inc.	118
S	
*Schrader's, A. Sons Co.	51
Service Steel, Div. Van Pelt Corp.	149
Signode Steel Strapping Co.	13
*Simmons Machine Tool Corp.	72
*Somers Brass Co., Inc.	9
Sprout Waldron & Co.	144
Stamco, Inc.	148
Stanhope, R. C., Inc.	143
Stainless Welded Products Co.	144
*Sterling Electric Motors, Inc.	55
Struthers Wells Corp., Titusville Forge Div.	108
Stueck W. Whitney, Inc.	148
Surface Combustion Corp.	22, 23
T	
Tennessee Coal & Iron Div. United States Steel Corp.	
Between Pages 16, 17	
Texas Company, The	60
Timken Roller Bearing Co., The	35
*Tinnerman Products, Inc.	8
Tractor & Equipment Co.	143
Trayer Products, Inc.	143
U	
*Udylite Corp., The	97
Ulbrich Stainless Steel	52
United States Steel Export Co. Between Pages 16, 17	
United States Steel Corp.	
Between Pages 16, 17, 146	
United States Steel Supply Div. United States Steel Corp.	
Between Pages 16, 17	
V	
Wallack Bros.	143, 145
Warner & Swasey Co.	20
Weiss Steel Co., Inc.	146
Wheeler, C. H. Mfg. Co.	147
Wheland Co., The	96
Williamsport Steel Co.	144
Winteritz, Sam'l L. & Co.	139
*Worcester Stamped Metal Co.	137
Y	
Youngstown Foundry & Machine Co.	73
Youngstown Sheet & Tube Co., The	32
Youngstown Welding & Engineering Co.	16
Z	
CLASSIFIED SECTION	
Business Opportunities	145
Clearing House	138-144
Contract Manufacturing Appears in first and third issue of each month. See Nov. 3 & Nov. 17	
Employment Exchange	145-146
Equipment & Materials Wanted	144

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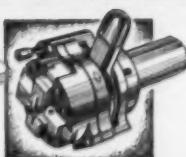
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There's a Bolted Steel Frame in This New Building in Florida

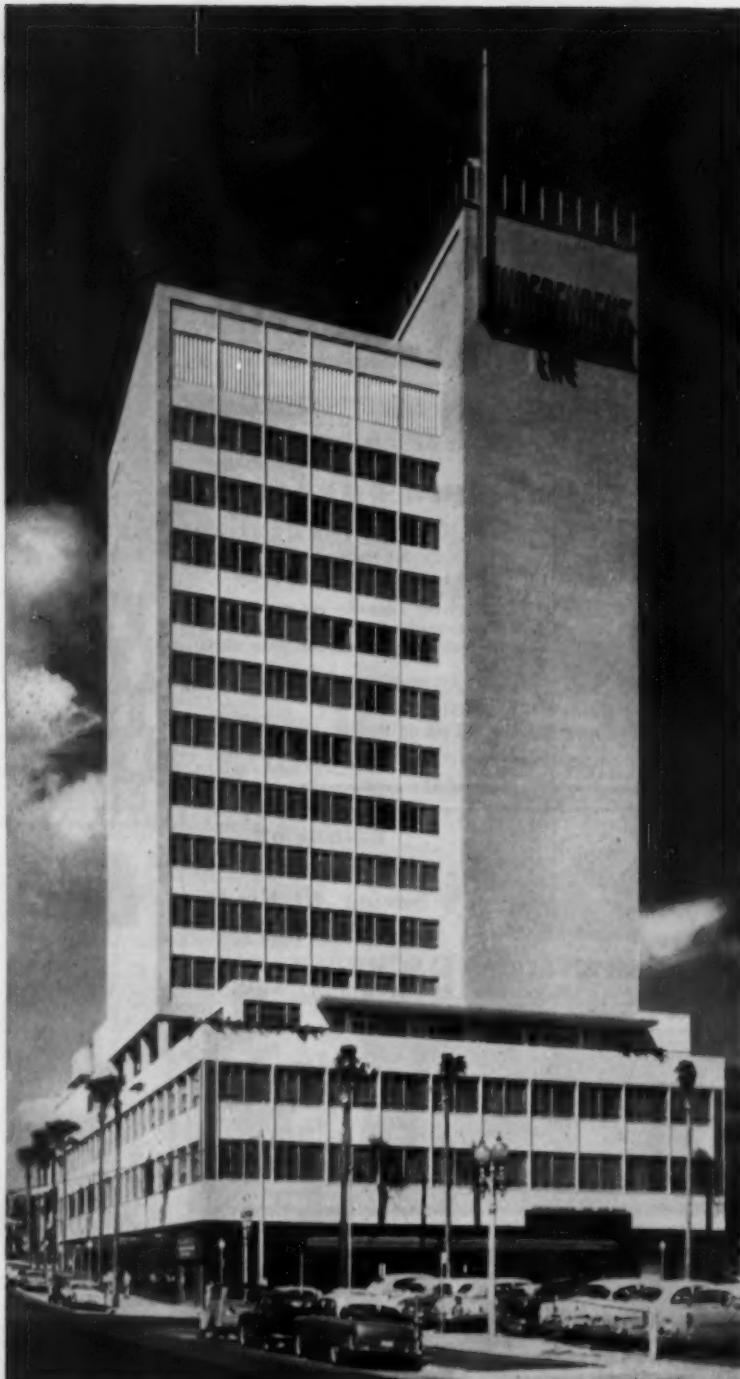
Here's a structure that is winning much favorable comment. It's the home office building of Independent Life and Accident Insurance Company, Jacksonville. It is 18 stories high, and L-shaped, and is topped by an attractive illuminated pylon of stainless steel.

The building, covering 16,800 sq ft of ground area, is faced with Indiana limestone, trimmed with glazed brick. Emerald-pearl Swedish granite is used for the first-floor facing. Mechanical equipment is grouped on the upper floors, an innovation in the Southeast for buildings of this type. The structural members making up the 1500-ton steel framework are bolted together with thousands of Bethlehem High-Strength Bolts.

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Bethlehem High-Strength Bolts join structural members of 1500-ton framework for Independent Life and Accident Insurance Company building, Jacksonville. Steel fabrication and erection by Bethlehem. Architects: Kemp, Bunch & Jackson; General Contractors: S. S. Jacobs Company; Consulting Structural Engineer: J. L. McCollough.

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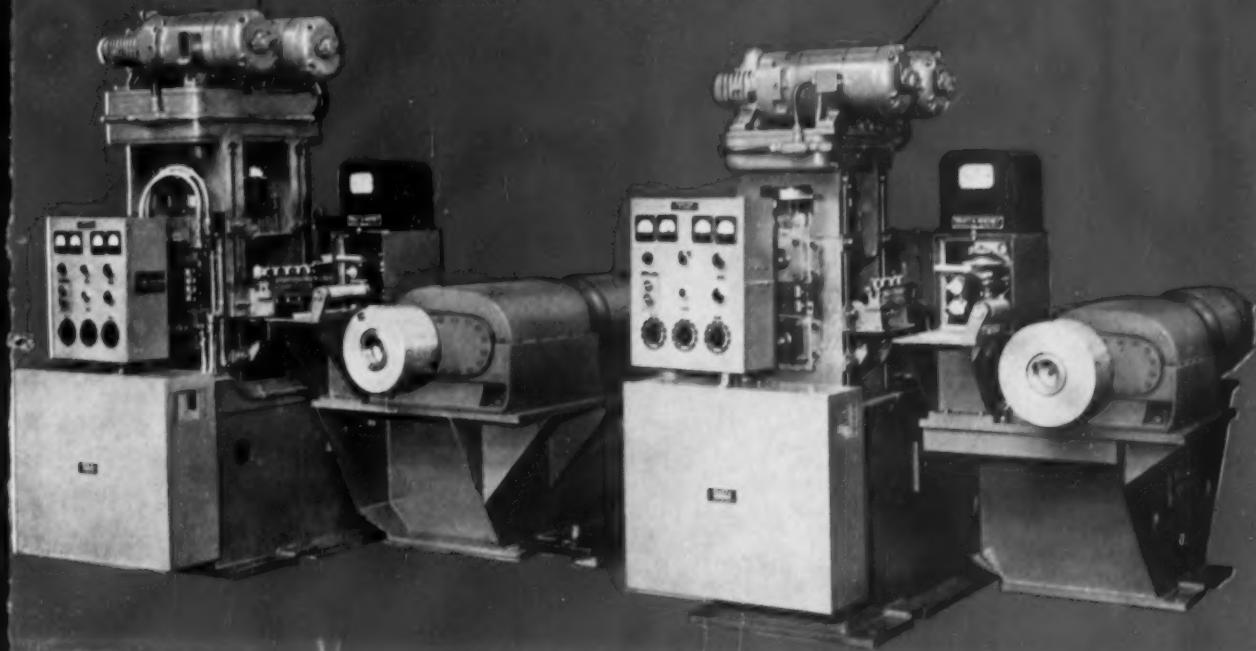


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With many other features, the all new King provides industry with a high-efficiency machine tool capable of taking full advantage of new cutting tools, new materials, new methods. For full details, send for new Catalog K-5. Write direct or to the King distributor in your area.

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WIDE VARIETY
OF HEAD
COMBINATIONS
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Complete Electrical Controls

All electrical controls are conveniently located on the pendant station and on a fixed panel mounted on the side head. The following controls are located on the pendant, in areas indicated:

FEED AND RAPID TRAVERSE MOVEMENTS
Rail heads on machines with 2 heads on rail.
Side head and side head on machines with one head on rail.
POWER DIVULGATION OF RAIL FEEDS

FEED-SELECTIVE SPEED SELECTION
FROM DIRECT-READING DIAL
SELECTION OF RAIL HEAD FEEDS
FROM DIRECT-READING DIALS

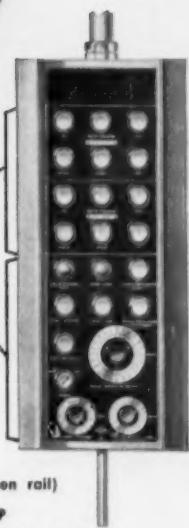
SPEED CHANGE - TURRET INDEX - TABLE STOP

FIXED PANEL on side head has controls for:
FEED SELECTION FROM DIRECT-READING DIAL
FEED AND RAPID TRAVERSE MOVEMENTS

OF SIDE HEAD (on machines with two heads on rail)

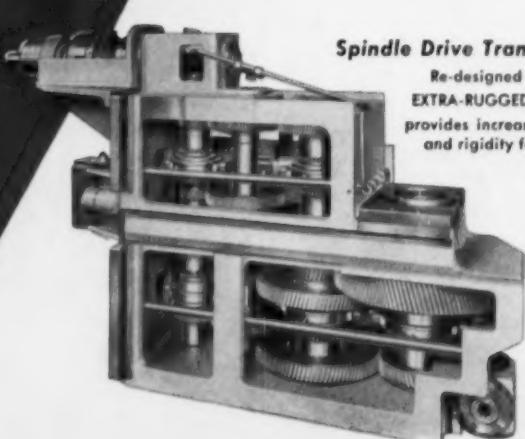
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EXTRA-RUGGED HOUSING
provides increased stability
and rigidity for mounting
of shafts.



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